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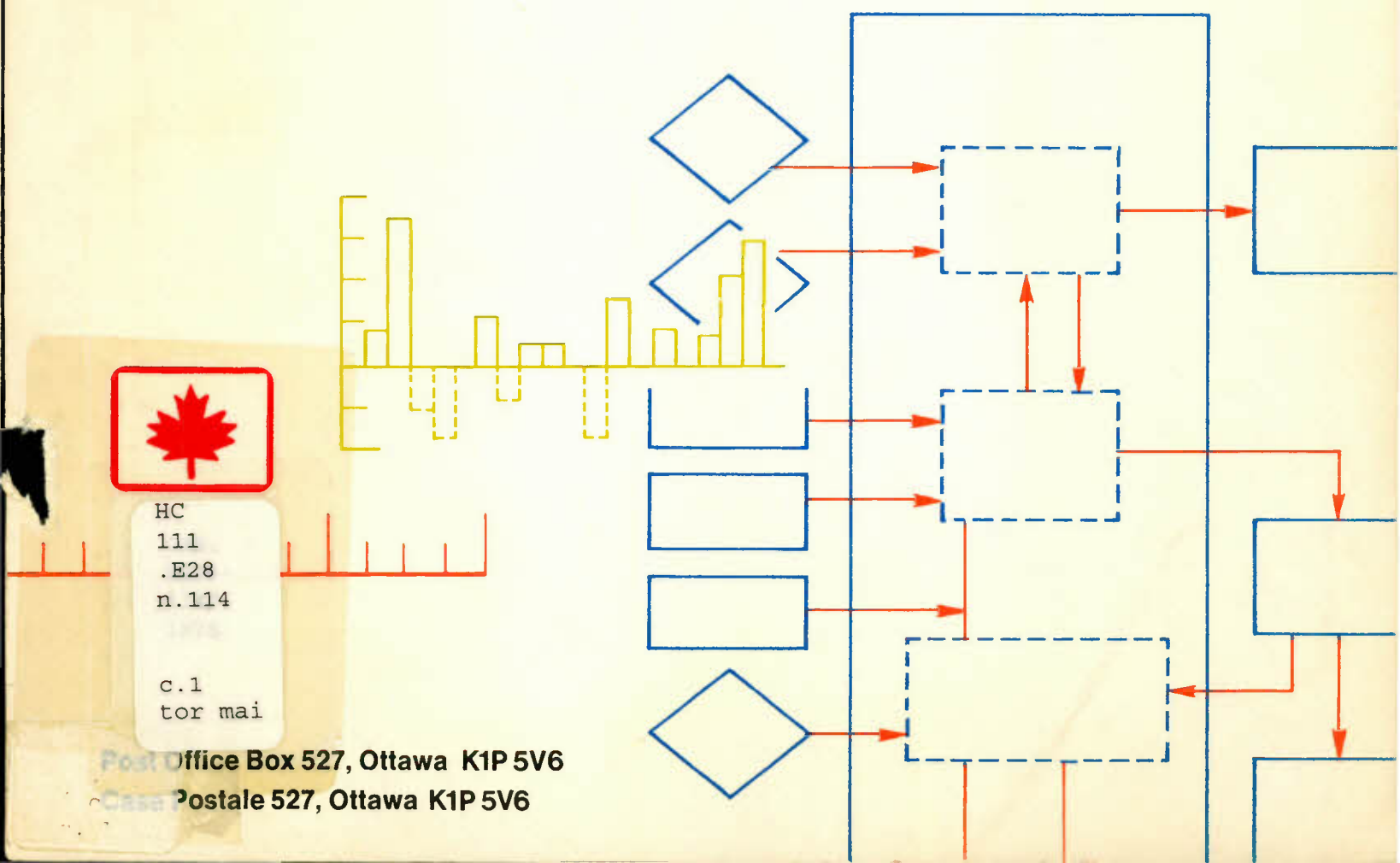

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Private Pensions in an Inflationary Climate: Limitations and Policy Alternatives

by

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RÉSUMÉ

Dans un contexte inflationniste, les régimes de pension privés se heurtent à deux importantes restrictions. La première est la non-transférabilité de certains régimes à prestations déterminées et la reconnaissance que, même si l'employé dont l'emploi cesse a acquis des droits à la pension, la rente différée qui lui revient risque d'être grandement érodée par l'inflation au cours des années précédant sa retraite. La seconde est l'incapacité apparente des promoteurs de régimes à prestations déterminées à s'engager par contrat à indexer les pensions après la retraite, ainsi que l'impuissance des participants aux régimes à cotisations fixées d'avance à se procurer des rentes indexées des compagnies d'assurance-vie.

L'analyse présentée dans cette étude montre que, du moins jusqu'à aujourd'hui, seuls les gouvernements centraux ont accepté les risques d'une inflation non anticipée. Au Canada, une option qui retient beaucoup l'attention actuellement est l'émission éventuelle d'obligations indexées par le gouvernement fédéral. Toutefois, cette solution comporte un dilemme fondamental, à savoir: (1) si le gouvernement fédéral donnait à ces obligations une diffusion suffisante pour permettre en fait aux promoteurs des régimes de pension d'assurer des prestations indexées, l'effet de cette initiative sur les marchés financiers canadiens pourrait être suffisamment grave pour rendre cette option inacceptable, et (2) si le gouvernement fédéral restreignait la diffusion de ces obligations indexées ou la rendait plus graduelle, de façon à minimiser leurs répercussions sur le système financier canadien, la possibilité pour les promoteurs de régimes de pension d'assurer des prestations indexées ne s'accroîtrait que graduellement.

Dans cette étude, nous préférons une autre solution, soit une garantie contre le risque d'inflation offerte par le gouvernement fédéral sous forme d'une assurance-inflation. En vertu de cette proposition, les compagnies d'assurance-vie, par exemple, vendraient des rentes déterminées selon les taux d'intérêt réels. On pourrait ensuite accroître ces rentes suivant le taux d'inflation prévu au moment de leur vente, comme l'illustrent les primes contre l'inflation incorporées dans la structure des taux d'intérêt nominaux, sans imposer aux promoteurs des régimes de pension des coûts supérieurs à ceux qu'ils auraient à supporter dans un climat non inflationniste. Le gouvernement permettrait ainsi aux compagnies d'assurance-vie de vendre des rentes indexées en les assurant contre la possibilité que le taux d'inflation puisse dévier de la trajectoire prévue. La proposition insiste sur le fait que pour éviter que le revenu n'échappe aux membres des régimes à prestations déterminées au profit des promoteurs, les rentes doivent être achetées sur la base de taux d'intérêt réels plutôt que nominaux.

ABSTRACT

There are two major limitations of private pension plans in an inflationary climate. The first is the lack of portability of defined pension plans and the recognition that, even if the terminating employee is vested, the deferred annuity to which he becomes entitled is likely to be seriously eroded by inflation during his pre-retirement years. The second is the apparent inability of sponsors of defined benefit plans to commit themselves to contractual indexation during the post-retirement period, and the parallel inability of members of money purchase plans to acquire indexed annuities from life insurance companies.

The analysis in this study indicates that, at least to date, only central governments have been willing to underwrite the risks associated with unanticipated inflation. In Canada, one option which receives much attention is the possible issuance of index bonds by the Federal Government. The fundamental dilemma with this solution is that (1) if the Federal Government makes index bonds available on a sufficiently wide scale to effectively enable plan sponsors to provide indexed pensions, then the potential impact on Canadian financial markets might be sufficiently dramatic so as to make this option unacceptable and (2) if the Federal Government were to make index bonds available on a more modest or gradual scale, so as to minimize the impact on the Canadian financial system, the capacity of plan sponsors to provide indexed benefits would only gradually be enhanced.

A preferred solution put forward in this study is the underwriting of inflation risk by the Federal Government in the form of inflation insurance. Under the proposed scheme, life insurance companies (for example) would sell annuities on the basis of real interest rates. These annuities could then be escalated at the expected rate of inflation at the time that they are sold, as evidenced by the inflation premiums built into the structure of nominal interest rates, without imposing additional costs on plan sponsors beyond those that they would incur in a noninflationary climate. The Government would then enable life companies to sell indexed annuities by providing insurance against the possibility that subsequent inflation might diverge from its expected path. The proposal highlights the fact that if income is not to be distributed away from members of defined benefit plans to the sponsors, annuities must be purchased on the basis of real rather than nominal interest rates.

PRIVATE PENSIONS IN AN INFLATIONARY CLIMATE:
LIMITATIONS AND POLICY ALTERNATIVES

I. INTRODUCTION

One of the central issues in the present debate regarding the appropriate mix of public and private pensions in Canada is the ability of the latter to provide adequate retirement incomes in an inflationary climate. This question, in turn, has two dimensions: (1) can private plans preserve the real value of the employee's benefits as they accumulate during his work years, and (2) can they preserve the real value of the employee's pension during his retirement years? A final earnings plan - in which the pension of the employee is geared to his income just prior to his retirement - coupled with the full indexation of the pension so obtained is required if the employee's pension is to be fully insulated from the effects of inflation which occurs in either his pre- or post-retirement years. A central issue is thus whether such a plan could remain actuarially sound in an inflationary climate.

As discussed at length in Pesando and Rea (1977), the answer in large part depends on the extent to which the real returns on the plan's assets are affected by inflation. If the real returns were unaffected by inflation, then the plan - in principle - could provide for an indexed pension during the employee's retirement years and yet remain actuarially sound. Further, the major source of the actuarial deficits or experience deficiencies suffered by final earnings plans during recent periods of high inflation would also be eliminated.

The importance of this issue leads inevitably to the question of how the real returns to pension plan assets, chiefly equities and fixed-income

securities, are affected by inflation. The most recent evidence, summarized in both Pesando (1977) and Pesando and Rea (1977), indicates that the real returns to a portfolio consisting of equities and/or fixed-income securities declines in response to an increase in the rate of inflation, regardless of whether the inflation is anticipated or unanticipated. Only a portfolio comprised exclusively of short-term bonds would produce a real return which was relatively unaffected by inflation. The real return on such a portfolio would not be completely neutral with respect to inflation, however, and - at least over long periods of time - its expected performance would be inferior to that of a portfolio consisting of long-term bonds and/or equities, as evidenced by the work of Ibbotson and Sinquefield (1975). If the primary purpose of variable annuities is to help insulate pension benefits from inflation, these results suggest that such annuities be tied to the yield on a portfolio of short-term bonds. The introduction of variable annuities in North America was premised on the notion that common stocks were the preferred investment hedge against inflation. This notion is largely discredited and the actual experience of variable annuities so constructed has undoubtedly served as a disincentive to their expansion.

The purpose of the present study is to review the extent to which private pension plans in Canada - both employer-sponsored and registered retirement savings plans (RRSPs) - provide adequate retirement incomes in an inflationary climate. The analysis will focus on both the pre- and post-retirement years, and considerable attention will be devoted to a critical analysis of alternative suggestions as to how the performance of

private plans in this regard might be improved. In view of the joint conclusion that (1) the availability of an asset whose real return is unaffected by inflation would greatly facilitate the provision of adequate retirement incomes in an inflationary climate and (2) the real returns to portfolios consisting of equities and/or fixed-income securities are adversely affected by inflation, considerable attention is devoted to the possible issuance of index bonds by the private or public sectors. This detailed analysis, in turn, provides useful insights into how the Federal Government might use insurance principles to underwrite the inflation risk inherent in the indexation of benefits provided by private pension plans.

II. THE PRESERVATION OF THE REAL VALUE OF PENSION BENEFITS AS THEY ACCUMULATE DURING THE PRE-RETIREMENT YEARS

1. Types of Plans and Vulnerability to Inflation

Employer-sponsored private plans are divided into two main types, defined contribution and defined benefit. In defined contribution plans, the pension is determined by the accumulated value of the contributions made by or on behalf of the employee. Defined contribution plans consist primarily of money purchase plans, but also include profit sharing plans. In defined benefit plans, benefits are predetermined by a formula and contributions are varied so as to produce the promised pension. There are two major categories of defined benefit plans, unit benefit plans and flat benefit plans. In unit benefit plans, pension benefits are determined with reference to remuneration of the employee for each year or for a selected number of years of service. These plans include career average plans, in which the plan member accumulates each year a unit of pension equal to a percentage of his earnings in that year, and final earnings plans, in which the member's pension is based upon his length of service and his average earnings (usually average best earnings) for a stated period just prior to his retirement. Finally, flat benefit plans are ones in which the pension benefit is expressed either as a fixed amount in respect of each year of employment or as a fixed periodic amount.

The relative importance of these alternative types of plans, by both number of plans and number of members, for the years 1960, 1965, 1970 and 1974 is presented in Table 1. In 1974, a significant majority (74.5 percent) of

TABLE 1
Plans and members by type of benefit, 1960, 1965, 1970 and 1974

	1960				1965			
	Plans		Members		Plans		Members	
	No.	%	No.	%	No.	%	No.	%
Unit benefit:								
Final earnings	28	0.3	10,793	0.6	44	0.3	23,434	1.0
Final average earnings	270	3.0	283,720	15.2	288	2.1	261,800	11.1
Average best earnings	117	1.3	632,295	34.0	238	1.7	859,771	36.7
Career average	2370	26.6	468,247	25.1	3956	29.0	667,224	28.5
Level percentage of earnings	-	-	-	-	84	0.6	1034	-
Totals	2785	31.2	1,395,055	74.9	4610	33.7	1,813,263	77.3
Money purchase	5392	60.4	242,127	13.0	7758	56.8	152,738	6.5
Profit sharing	211	2.4	23,616	1.3	351	2.6	28,253	1.2
Flat benefit	411	4.6	177,059	9.5	689	5.0	327,932	14.0
Composite	121	1.4	24,824	1.3	227	1.7	23,185	1.0
Other	-	-	-	-	25	0.2	227	-
Grand Totals	8920	100.0	1,862,681	100.0	13,660	100.0	2,345,648	100.0

	1970				1974			
	Plans		Members		Plans		Members	
	No.	%	No.	%	No.	%	No.	%
Unit benefit:								
Final earnings	16	0.1	5,613	0.2	24	0.2	6,691	0.2
Final average earnings	377	2.3	169,798	6.0	407	2.6	168,500	4.9
Average best earnings	970	6.0	1,260,917	44.7	1,245	7.9	1,685,556	49.2
Career average	4753	29.5	679,631	24.1	5,057	31.9	689,110	20.1
Level percentage of earnings	46	0.3	2,721	0.1	34	0.2	576	-
Totals	6162	38.2	2,118,680	75.1	6,767	42.7	2,550,433	74.5
Money purchase	8471	52.5	137,680	4.9	7,532	47.5	173,935	5.1
Profit sharing	310	1.9	21,374	0.8	258	1.6	19,184	0.6
Flat Benefit	742	4.6	424,623	15.0	878	5.5	622,910	18.2
Composite	265	1.6	26,221	0.9	230	1.5	34,241	1.0
Other	187	1.2	93,758	3.3	188	1.2	23,542	0.7
Grand Totals	16,137	100.0	2,822,336	100.0	15,853	100.0	3,424,245	100.0

SOURCE: Canada (1976,51)

members of employer-sponsored plans belonged to unit benefit plans, and the majority of these belonged to final earnings (or the average best earnings variant) plans. Flat benefit plans accounted for 18.2 percent of plan members, while money purchase plans accounted for 5.1 percent of plan members. For the 1960-1974 period as a whole, the major trends consisted of (1) a relative increase in final earnings plans (or their variants) and a corresponding relative decline in the importance of career average plans; a relative and an absolute decline in money purchase plans, and in defined contribution plans in general; and (3) a relative increase in flat benefit plans.

The alternative plans described above vary in an easily predictable fashion in the manner in which the member's benefits may be eroded by inflation even as they accumulate during his work years. Consider the major types of plans in decreasing order of their importance. Because wages and salaries in the aggregate tend to rise at the same rate as inflation (plus real productivity gains), final earnings plans effectively ensure that a member's benefits will not be eroded by inflation which occurs during his employment years. A member of a career average plan, on the other hand, is likely to see the real purchasing power of his benefits eroded by such inflation, at least in the absence of periodic liberalization of the benefit formula. Flat benefit plans, which would also appear to be unsatisfactory in an inflationary climate, are generally the byproduct of collective bargaining and the benefit formulas have typically been increased

during inflationary periods as an integral part of subsequent contract negotiations. Finally, the adequacy of money purchase plans depends in large part on how the real returns on the accumulated contributions are affected by inflation. In view of the adverse impact of inflation on the real returns to portfolios consisting of equities and/or fixed-income securities, as discussed in the introduction to this report, the capacity of money purchase plans to preserve the real value of their members' benefits must be considered suspect.

To sum up, only final earnings plans are contractually suited to preserving pension benefits as they accumulate. Career average and flat benefit plans, in turn, are not likely to be so inadequate as their benefit formulas might at first suggest since these formulas tend to be liberalized in response to periods of high inflation. Significantly, final earnings plans have increased in both absolute and relative importance in recent years, and their growth cet. par. is likely to be further encouraged by favourable changes in both Federal tax regulations and provincial funding requirements, as noted by Pesando and Rea (1977).

Finally, the adequacy of RRSPs in an inflationary climate also merits comment. In 1973, 758,000 Canadians contributed to RRSPs, and 457,000 of these - or 60 percent of the total - did not belong to an employer-sponsored plan (Canada, 1976). In total, those who contributed to RRSPs in 1973 represented 22 percent of those who were members of employer-sponsored plans. Total RRSP contributions in that year equalled $922 million, or

almost one-third of the $3 billion contributed to employer-sponsored plans in 1974 (the closest date for which data are available). RRSPs are, of course, defined contribution plans, and their limitations in an inflationary climate parallel those cited earlier. In particular, the real returns to these plans' assets are likely to be adversely affected by inflation and hence their ability to preserve contributors' real benefits in an inflationary climate must be considered suspect.

2. The Income Redistributive Effects of Inflation

The preceding discussion raises the question of how inflation redistributes income between the employee and the employer (sponsor) in the alternative types of plans. The question is most usefully posed in the context of final earnings and career average plans, as these are the most important quantitatively and represent situations in which the employee's benefits are and are not protected from inflation during his work years. To focus precisely on this income redistributive issue, it will be assumed initially that the real return to the plan's assets is unaffected by inflation. This assumption rules out the possibility that the employer and employee can - on balance - be net losers from inflation, and also serves as a useful background to the later discussion of the possible issuance of index bonds. The assumption will be relaxed during the latter portion of the discussion.

The income redistributive effects of inflation are most easily understood in the context of specific numerical examples. To keep the examples as simple as possible, the following set of assumptions is employed throughout the discussion:

1. The employee joins the firm at age 35 and - with certainty - remains with the firm until retirement age of 65, at which point he draws a pension for exactly 10 years.

2. The employee's earnings are projected to remain constant at $10,000 per year.

3. The employee earns a pension equal to 2 percent of salary for each year of service, and is thus expected to be entitled to a pension of $6,000 per year.

4. The real return on the plan's assets is zero.

5. Level premium funding is employed, with contributions in each year set equal to the same fraction of the employee's income.

The present value at age 65 of the promised pension in this simplified example is thus $60,000, and annual contributions of $2,000 or 20 percent of the employee's earnings are thus required to purchase the pension. Note also that, given the assumption that the employee's earnings are constant throughout his lifetime, no explicit distinction (as yet) must be made between the final earnings and career average alternatives. The questions to be addressed are as follows: (1) how is income redistributed if inflation of 10 percent, matched by a corresponding increase in the employee's nominal earnings (and in the nominal return on the plan's assets), occurs in his final year of employment; (2) how are the results altered if the

accumulated pension benefits are not fully funded at the time that the inflation occurs?

Consider the first question when the plan is of the final earnings variety and thus the employee's pension is equal to 60 percent (2 percent times 30 years of service) of his earnings at age 65. Since his final salary is now $11,000, his pension will be $6,600 and will have a present value at the employee's retirement date of $66,000. The cost of the required annuity will thus have increased by $6,000. Clearly, the real value of the employee's pension has been preserved since it is now 10 percent higher in a world where the price level is 10 percent higher. Are there any additional costs imposed on the employer? If the accumulated benefits are paid for, then the value of the fund when the employee is age 64 is $58,000. Since the nominal return on the plan's assets - by assumption - rises to 10 percent so as to preserve the real return of zero, the fund will generate additional revenues of $5,800. When this $5,800 is added to the increase in (nominal) contributions of $200, or 20 percent of the $1000 (nominal) increase in salary, the total cost of the increased pension is met without imposing any extraordinary costs on the employer.

Consider now what happens in the above scenario if the employee belongs to a career average plan. His pension will now be $6,020 (29 times .02 times 10,000 plus one times .02 times $11,000), which will have a present value at his retirement age of $60,200. The cost of the required annuity will thus have increased by only $200. If past service liabilities are

fully funded as before, then the fund will - as before - generate additional revenues of $5,800. When the additional $200 (20 percent of the salary increase) is paid in as a higher (nominal) contribution, the additional revenues to the plan total $6,000 as before. The employer thus realizes a net gain of $5,800, which exactly matches the present value (at zero real interest) of the $580 annual decline in the real value of the pension over its 10-year duration. Clearly, inflation in this example has served to redistribute income from the employee to the employer.

The sensitivity of the above results to the existence of any unfunded liabilities is also readily apparent. If, for example, the fund when the employee reached age 64 were only 50 percent of the amount necessary to pay for past service liabilities, or only $29,000, then the additional revenues earned by the fund in the final year would only be $2,900. In the case of the final earnings plan, the employer would incur additional costs of $6,000 and receive additional revenues of only $3,100. The real income of the employee is preserved, but the employer appears to have incurred a net increase in costs of $2,900. In fact, however, this is not necessarily the case. To complete the story, the additional revenue earned by the employer on the funds ($29,000) which would otherwise have been invested in the plan must be considered. If the real return earned by the employer on these funds, regardless of what the real return is or where the funds are invested, is unaffected by inflation, then his earnings elsewhere

would have increased by $2,900 to offset the apparent loss arising in his pension plan. Alternately, the employer may be viewed as having borrowed from the plan an amount equal to the unfunded liability ($29,000) on which he is committed to paying a zero real rate of return. If the real return on the proceeds of this loan falls in response to inflation, then the employer suffers a net loss from inflation, and conversely.

The above examples highlight the following points. If the real return to a plan's assets is unaffected by inflation, then inflation redistributes income only between the employer and the employee. Only for the case of extreme final earnings plan, in which pension benefits are tied (only) to the salary in the employee's final work year, is the real benefit of the plan member preserved and hence is there no income redistribution in favour of the employer. Further, the net loss to the employer which may arise if past service liabilities are not fully funded must be interpreted with care. Inflation redistributes income from the sponsor of the plan to other economic agents if the real return on the funds "borrowed" from the pension plan falls in response to the increase in inflation.

Finally, the above examples presumed - for the sake of simplicity - that the real return on the plan's assets is equal to zero. If a higher real return is assumed, then - in the case of the final earnings plan - there is a modest redistribution of income from the employer to the employee which reflects the fact that intended contributions in the final year, when

augmented by the 10 percent inflation rate, fall short of the amount necessary to balance additional revenues with additional costs. If a real return of 5 percent is employed, and if level premium funding is presumed, then projected annual contribution would be $697 per year or 6.97 percent of salary. If inflation of 10 percent occurred as before, then the present value at age 65 of the additional $600 in pension will be $4,633. The fund will generate additional revenues in response to inflation of $4,346, which - combined with additional contributions (6.97 percent of the additional $1,000 in earnings) - will fall $217 short of the amount needed to offset the additional costs. This amounts to 31 percent of the annual contributions initially projected for the plan, and does isolate a potential redistribution of income from the employer to the employee. The shortfall in this example stems ultimately from the fact that the capital sum necessary to purchase the indicated pension is less than in the earlier case since the corresponding annuity can be purchased at a 5 percent interest rate. As a result, the funds accumulated at age 64 are not sufficient - when augmented by the 10 percent inflation factor - to compensate the plan sponsor for his increased costs. (If, by contrast, the plan earned a 5 percent real return on its accumulated contributions, but could only purchase the requisite annuity at a real rate of zero, the employer would incur no additional costs as in the first example.) Since the employer's contributions to the plan are appropriately viewed as deferred wages, the shortfall represents a gain to the plan member since total contributions on his behalf prove to be inadequate to purchase the

indicated pension. Note finally that a 5 percent real return is rather high, and that a lower real return in this example - which would better approximate the return available to plan managers - would reduce the magnitude of the additional (employer) contributions made necessary by inflation.

As emphasized, if the real return to the plan's assets is unaffected by inflation, any income redistributive effects of inflation occur only between the employer and the employee. This assumption was invoked to examine these redistributive effects for a career average and a final earnings plan. In fact, however, the real return on a typical pension plan's portfolio is adversely affected by inflation, raising the distinct possibility that the employer and the employee combined can be net losers when inflation occurs. In this case, income is clearly redistributed to the issuers of the fixed-income securities which plans hold in their portfolios. The net gainers in the case of equities are more difficult to identify. If, however, before-tax real corporate earnings are unaffected by inflation but real after-tax profits decline as a result of the tax treatment of inventories and depreciation, then the resulting decline in share prices is associated with the redistribution of income by inflation to the government in the form of higher taxes. The increase in experience deficiencies (actuarial deficits) in recent years, especially for final earnings plans, suggests that employees and sponsors of private plans may have - as a unit - suffered real income losses as a result of the recent acceleration in the rate of inflation in Canada. As noted, however, if an index bond or its

equivalent were available, then the income redistributive effect would be confined to the employee and the employer. For final earnings plans, the net redistributive effects would likely be small. On the one hand, the fact that most benefit formulas are based on more than the final year's earnings serves to redistribute income to employers, while the fact that the plans are costed at positive real returns serves to redistribute income to employees.

3. The Lack of Portability: Limitations and Policy Alternatives

Only final earnings plans preserve - on a contractual basis - the pension benefits of the employee as they accumulate during his work years. These plans still suffer from one major limitation in an inflationary environment - their general lack of portability. Typically, the terminating employee is treated in one of two ways. If his benefits have not vested, he receives his contributions and accumulated interest, which he can then roll over into an RRSP. If his benefits have vested, he must take his benefits in the form of a deferred annuity. In this latter case, he does not have the option of having his past service credits integrated into the benefit formula of the plan of his new employer. With a few exceptions among public sector plans, the pension to which the vested employee becomes entitled is not portable. This problem, together with alternative proposals designed to ameliorate it, constitutes the subject matter of this section of the report. (For a detailed discussion of the vesting and "locking-in" issues in an inflationary

climate, see Pesando and Rea (1977), especially chapter two. A major limitation of "locking-in" the vested employee's contributions, as discussed below, relates to the purchase of deferred annuities at nominal rather than real rates of interest.)

Consider the case of an employee who enters the labour force at age 25 and changes jobs every 10 years. Even if (1) each of his employers sponsors a final earnings plan and (2) his benefits vest with each employer, his final pension will closely resemble that which he would receive if he had remained with a single employer who sponsored a career average plan. From each of his first three employers, he receives a deferred pension tied to his salary at his termination date. Only from the fourth (and last) employer does he receive a pension tied to his final earnings, for which he has (only) 10 years of service credits.

The fact that the mobile employee's pension benefits are being eroded by inflation, even if his employers all sponsor final earnings plans, is readily apparent. His final pension will, in effect, be of the career average variety, whose limitations in an inflationary climate have already been discussed. What is equally apparent, however, is that the loss to the employee is matched by a corresponding gain to the employer. This result follows immediately if the real returns to the plan's assets is unaffected by inflation, since - in this case - the net impact of inflation on the incomes of the employer and employee must be zero. The result is usefully illustrated by a simple numerical example.

Consider the case of a terminating employee, age 45, who is entitled to a vested benefit of $1,000 per year, to commence at normal retirement age of 65. If there is no inflation, and if the real return on the plan's assets is zero, the cost to the employer of purchasing the requisite annuity is $10,000 on the assumption that (with certainty) the employee lives to draw his pension for exactly 10 years. If the rate of inflation rises permanently to 5 percent, and if nominal interest rates rise to 5 percent as well (so the real return to the plan's assets is unchanged at zero), the cost of purchasing this same annuity falls to $2,910. If the rate of inflation rises to 10 percent, with a corresponding rise in nominal interest rates, the cost of the annuity falls to $913! The dramatic decline in employer costs in these examples reflects the expected decline in purchasing power of the terminated employee's pension benefits by inflation which occurs both (1) between his termination date and date of retirement and (2) during the period in which he draws his pension. If inflation rose to 5 percent and 10 percent, respectively, during the period between his termination date and age of retirement, and then returned to zero during his retirement period, the decline in costs would be less dramatic. If nominal interest rates continue to mirror the rate of inflation, the cost of the annuity would fall from $10,000 to $3,769 in the 5 percent case, and to $1,487 in the 10 percent inflation case. In all of these examples, the cost saving to the plan sponsor is mirrored in the expected decline in the real purchasing power of the fixed-income annuity. This decline, in turn, reflects the presence of inflation premiums in nominal interest rates and highlights the fact (to be elaborated upon later) that such annuities should be purchased on the basis of real interest rates.

From the preceding discussion, the portability problem would clearly be solved if all employers offered sufficiently similar final earnings plans such that they could credit new employees with past service, and receive in turn from prior employers an amount sufficient to purchase the deferred annuities to which the employees have already become entitled. Although this reciprocity exists among certain public sector plans, and is certainly to be encouraged, the diversity of plan structures imposes inherent limitations on its expansion. Two alternative proposals, which have recently been put forward, are analyzed below.

Universal RRSPs with Defined Contributions for both Employers and Employees

This proposal, which would replace all present plans - both private and public - with universal RRSPs in which mandatory contributions would be "locked-in" until retirement, would certainly solve the portability problem. As noted, however, RRSPs are defined contribution plans, and their ability to insulate an employee's accruing benefits from inflation depends crucially on the extent to which the real returns on the associated assets are affected by inflation. Since the real returns to both fixed-income securities and equities are adversely affected by inflation, the ability of universal RRSPs to preserve the real value of pension benefits as they accumulate - the ultimate goal in addressing the portability question - must be viewed with suspicion. If an index bond or its equivalent are available, and if the

real return so provided were approximately equal to the average increase in the productivity of labour (which would determine the real value of pension benefits under a final earnings plan), the attractiveness of this option would be greatly enhanced. The possible issuance of index bonds, as well as their likely yields, receives detailed attention later in this report.

Earlier Vesting Combined with Indexation from Termination Date until Retirement

The two central features of this proposal can logically be treated separately. A detailed treatment of the vesting question may be found in Pesando and Rea (1977) and will not be repeated here. Although the recognition that employer contributions on an employee's behalf represent deferred wages invites the move to immediate vesting, the implications of this move must be considered. Such a move, for example, is likely to lead employers to establish wage grids which are more steeped with respect to experience as an alternative means to retain skilled employees and to reduce employee turnover. The mobile employee is thus likely to experience costs similar - although less discontinuous - to those associated with the forfeiture of employer contributions when employee benefits do not vest. Further, for contributory defined benefit plans, the employee's own contributions often purchase most of the pension benefits to which he becomes entitled in his early work years (especially if nominal interest rates are high in anticipation of inflation), and the advantage of immediate vesting - especially if the funds so accumulated are "locked-in" - is probably illusory.

The proposal to index the terminating employee's benefit through retirement age is, however, a very appealing one. As noted, the employer receives a windfall gain from inflation which pushes up nominal interest rates and thus lowers the cost of the requisite annuities. Again, if real returns were neutral with respect to inflation, this proposal would simply eliminate the redistribution of income from the employee to the employer which would ordinarily occur in this instance. Interestingly, new pension legislation in the United Kingdom, in the form of the Social Security Pensions Act of 1975, requires not only that private plans (in effect) be of the final earnings variety, but also that - after 5 years service - the accrued pension of the terminating employee must be earnings-indexed until retirement.

The obvious question which next arises is how employers are likely to react to this proposal. One perspective on this issue can be obtained by noting the oft-cited "paradox" that employers are willing to provide final earnings plans which effectively index employee pensions prior to retirement, but are unwilling to commit themselves to index pensions after retirement. The resolution of this apparent paradox must lie largely with the fact that the employer is in a position to shift accelerating costs (in part) back to the active employee. If, for example, the plan experiences a sharp increase in its actuarial deficit as a result of accelerating wages and declining real yields, the employer can shift part of the cost to the active employee by (1) raising contribution rates or - more likely - (2) granting lower wage increases than would otherwise be the case. From this perspective, employer

reluctance to provide for indexation from termination to retirement might be anticipated, since - just as the case of indexing benefits after retirement - the employer cannot shift part of any extraordinary increase in costs back to the employee. In addition, to the extent that the non-indexation of vested pensions helps the employer to retain skilled employees and to reduce turnover, resistance - and compensating changes - can be expected.

This indexation is, however, crucial if private plans are to provide adequate pensions in an inflationary climate. In the U.K., employers have several options with regard to the funding of indexation through retirement age. As an alternative to assuming the full cost, the employer can make a lump sum payment to the national insurance fund when the employee leaves and thus limit his indexing liability to 5 percent per year. In effect, the government sells insurance against the possibility of large increases in inflation and hence in average earnings, to which the promised benefits must legally by linked.

The preferred option to provide employers with respect to the funding of this liability would appear to be a combination of (1) exploiting the inflation premium in current interest rates to determine the amount of indexing to which employers must commit themselves and (2) the sale of insurance by the Federal Government which would focus on the cumulative deficit (or surplus!) if subsequent inflation diverged from the expected rate built into the level of interest rates at the time of termination. This proposal in the context

of facilitating the indexing of pensions after retirement is treated in much greater detail later in this report, and the logic and details will be postponed until then. Once again, however, the access to an index bond or its equivalent would enable the employer to assume this cost in a manner exactly analogous to the case of no inflation. The deferred annuity would be purchased, in effect, at a low real interest rate, thus eliminating the windfall gain to the employer associated with the existence of an inflation premium in the level of interest rates. At the same time, the employer would not need to worry about the open-ended commitment which is often associated with the provision of indexed benefits.

4. Summary

Final earnings plans, which now include 54.3 percent of members of employer-sponsored plans, preserve the real value of employee benefits from inflation as they accumulate during his work years. Encouragement of their continued growth should remain an objective of the federal tax and provincial regulatory authorities. Analysis of the income redistributive effects of inflation for alternative plans during the retirement years is usefully conducted under the initial assumption that the real returns to a plan's assets are unaffected by inflation. Under this assumption, inflation is likely to redistribute income from employees to employers/sponsors for all defined benefit plans except for final earnings plans. This income redistribution represents the erosion of the real value of employee benefits as they accumulate. Since current evidence indicates that inflation adversely

affects the real returns on traditional pension plan portfolios, inflation can redistribute income away from the employer/employee unit, since the loss to the employee need no longer correspond to a gain to the employer. The recent increase in actuarial deficits of final earnings plans provides some evidence that this has been the case, with the issuers of fixed-income securities and (possibly) the government being the net gainers from inflation. The existence of unfunded liabilities complicates, but does not fundamentally alter, the conclusions reached above.

Finally, the lack of portability of final earnings plans represents a major obstacle to their ensuring that pension benefits are not eroded during the employee's work years. The indexation of benefits for vested employees from termination to retirement is a legitimate and desirable goal in this area. In its absence, inflation once again redistributes income from the plan member to the employer and/or to the issuers of fixed-income securities and (possibly) the government. The preferred means of facilitating the employer's underwriting of this expense is to tie indexing to the inflation premium in interest rates at the termination date, and to have the Federal Government underwrite the risks associated with the divergence of subsequent inflation from its expected path. The logic for this dual proposal is amplified in the later discussion of the provision of indexed pensions after retirement.

III. INDEXATION DURING THE POST-RETIREMENT YEARS: AN OVERVIEW

1. The Lack of Indexation in Private Pension Plans

With the notable exception of the Public Service Superannuation Plan for Federal civil servants and certain provincial plans for their employees, the vast majority of employer-sponsored plans in Canada do not provide for the contractual indexation of benefits during the member's retirement years. The significance of this point is difficult to overestimate. With an inflation rate of only 6 percent a year, modest by recent standards, the real value of a fixed-dollar pension will have fallen to only 56 percent of its original value after 10 years. At present, most employers have responded to the recent period of high inflation by providing ad hoc increases to pensions currently in force, and it is widely conceded that these ad hoc adjustments have typically fallen short of the amount necessary to preserve the real value of these benefits. Indeed, the apparent limitation of private plans in this regard has been a major argument of those groups, such as the Canadian Labour Congress, who advocate the absorption of private plans into an expanded version of the Canada Pension Plan (C.P.P.).

As noted at length by Pesando and Rea (1977), employer-sponsored plans could provide fully indexed pensions and remain actuarially sound if they had access to an index bond or its equivalent. The fact that inflation tends to depress the real return on traditional pension plan portfolios makes it highly unlikely that private firms will be willing to accept the "open-ended"

commitment associated with indexed pensions. Significantly, those plans in the public sector which provide for fully indexed benefits are ultimately underwritten by the taxing powers of the respective levels of government. The new pension legislation in the United Kingdom requires that the benefits of all private plans - up to the guaranteed minimum pension - be fully indexed with respect to inflation. Significantly, the cost of this indexation is borne by the government, although private firms contribute toward it implicitly in the form of statutory, earnings-related contributions to the state plan. Once again, the taxing powers of the government are employed to underwrite the risks associated with indexed pensions in an economy where unrestricted access to index bonds or their equivalent does not exist.

The argument has recently been put forward, most notably by Geoffrey Calvert (1977), that full indexation of pensions is neither necessary nor desirable. This viewpoint appears to be receiving a good deal of sympathy, at least within the business community. The next section of this chapter thus presents a critical analysis of the arguments in favour of partial indexation. This discussion is followed by a brief review of the proposal that the C.P.P. be expanded as a means of ensuring the indexation of benefits during the post-retirement period. The detailed discussion of the index bond alternative is postponed until the next chapter of this report.

2. Is there a Case for Partial Indexation?

Discussions of the supposed dangers of widespread indexation, which

occasionally surface in business discussions, exhibit a fundamental misunderstanding of the problem posed by inflation. If the pensions of retirees are fully indexed with respect to inflation, their claim on real output of the economy is simply maintained, not increased. Only if real GNP declined would the relative share of output going to pensioners increase, but even here their absolute claim on real output would remain unchanged. The claim that the economy as a whole cannot "afford" indexation must implicitly assume that an acceleration in the rate of inflation exerts a depressing influence not only upon the rate of growth of real GNP, but also upon its level.

Even a casual review of received macroeconomic doctrine, however, serves to discredit this possibility. At least until very recently, economists associated an increase in the rate of inflation in the short run with an increase in the rate of growth of real GNP, and conversely. This result follows either from the expectations or "implicit" contract explanations of the short-term Phillips curve. In both, unanticipated inflation leads to a reduction in real wages which encourages firms to expand output. Further, both theories suggest that, over the longer term, the real rate of growth of the economy will be determined by supply factors and will be independent of the steady, long-term rate of inflation. This latter proposition is typically recast in the statement that the long-term Phillips curve is vertical.

Recent attention has focused on the role of supply "shocks", such as those associated with agriculture failures or adverse changes in the terms of trade occasioned - for example - by the successful formation of an international

oil cartel. Such "supply shocks" can cause a short-run increase in the price level to be associated with a reduction in the real rate of growth of GNP. Clearly, such forces have exerted an adverse impact on the performance of the North American economies during the past few years. The likelihood of a continued succession of such shocks sufficient to produce a long-term negative association between the rate of inflation and the rate of growth of real GNP would, however, appear to be remote, at least based on historical experience.

To sum up, there is no reason to believe that a long-term increase in the rate of inflation will lead to a reduction in the real rate of growth of GNP, let alone in the level of real GNP. The oft-cited business concern that high inflation in Canada will reduce its "competitiveness" in international markets ignores the inevitable adjustments in the foreign exchange market, which suggest - in long-term equilibrium - than any excess in the rate of inflation in Canada over its trading partners will be matched by a corresponding rate of depreciation in the Canadian dollar. Inflation remains, first and foremost, a problem by virtue of its often arbitrary effects on the distribution of income. The preceding macroeconomic arguments do not eliminate the possibility - or even likelihood - that inflation may redistribute income from plan sponsors by virtue of its adverse impact on the real returns to the plan's assets. Herein, as noted before, lies a legitimate economic problem. The argument that the Canadian economy as a whole cannot afford unlimited indexation is, by contrast, largely specious.

Consider now the specific arguments put forward by Geoffrey Calvert (1977)

to support the case for partial instead of complete indexation. He presents data which indicate that both the income and the expenditures of the elderly decline with age, and draws the conclusion that the cash needs of the elderly decrease as they get older. First and foremost, the data so collected could well have the opposite interpretation: expenditures of the elderly decline with age because their incomes decline with age. Second, even if cash needs decline with age, it still does not follow that partial indexation is sufficient to preserve the real value of the incomes which are used to finance life necessities. Consider the case of a life-cycle saver who responds to his lower needs in retirement by allocating his lifetime income so as to have a lower income in his retirement than in his work years. If his pension is the primary source of his income, and if it is only partially indexed, then his real income during retirement will be arbitrarily determined by the rate of inflation. How can this result possibly be justified as an intended result of economic policy?

Two other points with regard to partial indexation also merit comment. First, many authors - such as Calvert (see pages 76 and 79-80) - attempt to illustrate the cost of indexing pensions at alternative inflation rates by assuming that the nominal return on the pension plan's funds is unaffected. Such calculations are likely to overstate the cost of indexation and must be discounted accordingly. Second, reference is often made to the existence of other cost savings to the elderly, such as the provision of low-priced health care. Although this point, and the related concern that a special price index

for the elderly may be more appropriate than the consumer price index, has merit, there is also another side to this argument. Once again, consider the life-cycle saver who - in allocating his lifetime income between his work and retirement years - takes into account the existing structure of tax, health and other benefits that he can expect during retirement. To change these benefits directly, or indirectly by taking them into consideration in deciding the extent to which his pension should be indexed, is to impose a penalty on the rational consumer who has carefully considered his retirement needs and planned accordingly.

To sum up, the case for only partial indexation of pensions in force is at best weak and probably unsupportable. Although the ability of individual firms to underwrite indexed pensions is a legitimate concern, the ability of the economy as a whole to support indexed pensions is not.

3. Expansion of the C.P.P. to Ensure Indexed Pensions During Retirement

Individuals can save for their retirement in a number of ways: through public programs such as the C.P.P., through employer-sponsored pension plans, through individual RRSPs and other forms of personal saving. The alternative vehicles are close - but not perfect - substitutes for the accumulation of retirement savings. Savings in the form of C.P.P. contributions, for example, must be realized in the form of a deferred annuity which is fully indexed with respect to inflation. Savings in the form of contributions to an employer-sponsored plan, once benefits have vested, must also be taken in the form of a deferred annuity, but the pension so obtained is not likely to be

indexed. Savings in the form of an individual RRSP, by contrast, need not be taken only in the form of an annuity, since the holder can cash out prior to retirement subject to certain tax penalties.

Since these alternative savings vehicles are likely to be close substitutes, expansion of the C.P.P. is likely to have a significant adverse affect on the growth of private pension plans. The benefits of an expanded C.P.P. must thus be weighed against the costs of a reduction in the importance of private pension plans. This is clearly a multifaceted issue, and the present discussion will be limited to only one essential issue - the possible adverse effect on aggregate saving and hence on capital formation if the public program expands at the expense of private pension plans.

Central to this discussion will be future funding arrangements of the C.P.P. At present, the C.P.P. is partially funded and the excess of contributions over benefit payments and administrative expenses is lent to the provinces at subsidized rates. The question of whether the C.P.P. should depress aggregate saving is theoretically ambiguous. On the one hand, saving for retirement in the form of C.P.P. contributions, especially in the context of the large intergenerational income transfers which presently exist, might be expected to lead individuals to reduce their own savings for retirement in alternative forms. On the other, the possible incentive to early retirement and offsetting private bequests (e.g., children planning less support for their parents in view of the intergenerational transfers inherent in the present benefit and contribution structures) might lead individuals to increase their private saving. Feldstein (1974) presents evidence that the social security

system in the United States has served to depress private savings, although his results have been challenged by other researchers such as Barro (1977). For Canada, as discussed in Pesando and Rea (1977), there is no concrete evidence that the C.P.P. has served to depress private personal saving, although this result must also be viewed as tentative.

The question of how employer-sponsored pension plans affect aggregate saving also merits comment. In the context of a life cycle model of consumption and saving behaviour, the introduction of a fully funded plan is likely - as a first approximation - to leave personal saving unaffected. As noted by Feldstein (1977), an increase in deferred wages (the present value of future pension benefits) offset by an equal reduction in the current wage leaves the lifetime budget constraint unaltered, and thus should not alter planned consumption and saving behaviour. As usual, however, there are additional - and potentially offsetting - forces at work. On the one hand, if contributions for some individuals to employer-sponsored plans represent "forced saving", then aggregate private saving may increase. On the other, if a significant portion of the plan's liabilities are unfunded and this fact is not correctly perceived by shareholders, then their saving will increase by a smaller amount than that implied by their corresponding wealth loss (the present value of the unfunded liabilities), and hence private savings may decrease. Preliminary empirical work by Feldstein (1977) with U.S. data suggests that private pension saving has had no significant effect - positive or negative - on private saving.

The question of what would happen to the aggregate volume of saving in Canada if the C.P.P. were expanded at the expense of private plans is thus difficult to pinpoint a priori. If, as the Advisory Committee to the Canada Pension Plan has tentatively recommended, the C.P.P. is funded in the future on a pay-go basis, there is reason to believe that the net result would be a reduction in both saving and capital accumulation. If, as is perhaps more likely, the C.P.P. continues to be funded on a partial basis, the result may be similar. The likelihood of this result would be increased if, as at present, excess C.P.P. funds continue to be lent to the provinces at subsidized rates. There has been considerable concern that the provinces have employed the funds so obtained to meet operating expenses, especially those associated with skyrocketing health care and education costs, rather than to expand capital investments in the public sector.

A final aspect of any potential expansion of the C.P.P. must also be noted. If the scope of this program is increased, the residual role of private plans (including RRSPs) will be increasingly concentrated among high-income Canadians. As noted by Munnell (1977), this situation could lead to increasing pressure to remove the preferential tax treatment accorded such plans, which would - of course - greatly reduce their attractiveness. This argument would be even more persuasive if it could be shown that these tax incentives effectively apply to <u>intramarginal</u> rather than to <u>intermarginal</u> saving. In other words, if the amount of savings by high-income individuals is not increased by these tax incentives, their impact is to reduce tax revenues with no corresponding stimulus to private saving. Data on savings in the form of RRSPs suggests

that, at least for high-income individuals, this might already be the case. In 1973, for example, those individuals who were not members of employer-sponsored plans were entitled to contribute up to $4,000 to an RRSP if their earned incomes were $20,000 or above. In that year, the average contribution for individuals with incomes of $25,000 and over was $3,333 (Canada, 1977), or quite close to the maximum permitted by law. By implication, a large number of these individuals undoubtedly contributed the maximum amount, which might suggest that the intermarginal effect on their savings is small or insignificant.

4. Conclusion

The present method whereby most employer-sponsored plans respond to the erosion of benefits in force by ad hoc adjustments is not likely to prove adequate if high inflation continues. Further, the arguments for partial indexation (only) are found wanting, and suggest that full indexation is the appropriate route to follow. The potential expansion of the C.P.P. raises a host of questions, including a possible adverse effect on savings and capital accumulation, and any proposal to expand its scope to alleviate the indexation problem requires careful study. Finally, without an index bond or its equivalent, private plans cannot commit themselves to indexed pensions and yet remain actuarially sound, and most are unlikely to accept the "open-ended commitment" that contractual indexation provides. The possible issuance of

index bonds, or a similar program to eliminate inflation risk and the subsequent uncertainty to firms regarding the cost of full indexation, is the focus of the remaining two chapters of this report.

IV. INDEX BONDS: A PRACTICAL SOLUTION?

1. Introduction

The availability of index bonds would enable plan sponsors to commit themselves to full indexation during the member's post-retirement years without assuming an "open-ended" commitment. Equivalently, life insurance companies would be in a position to offer indexed annuities, sold on the basis of a real rather than a nominal rate of interest, to plan sponsors. Further, the availability of index bonds would eliminate the danger that inflation would redistribute income away from plan sponsors/members to other economic agents, as clearly has been the case in recent years.

These considerations invite the question of why no private firms in North America have responded to the recent period of high and volatile inflation by issuing index bonds. Indeed, the non-issuance of index bonds by the private sector represents a fundamental economic conundrum. There has been ample financial innovation in response to inflationary forces, and there are well-established precedents - such as cost-of-living clauses in labour agreements - for linking contracts to the behaviour of the price level. Is the non-issuance of index bonds by the private sector unique to North America, or is it common to other countries - such as Finland, Brazil, France, and Israel - where indexation of financial instruments has occurred? Is the non-issuance of index bonds by private firms in North America, which suggests they are not Pareto superior to traditional debt instruments, attributable to some form of market failure? If so, is there a consequent economic rationale for the government's issuing

index bonds? Alternatively, is the government's concern with the income redistributive effects which may occur in the absence of index bonds the sole rationale for such intervention?

These and related issues are addressed at length in this chapter of the report. The analysis begins with a brief review of the experience of four countries - France, Brazil, Finland and Israel - in which indexed financial instruments have been introduced. The analysis then turns to a detailed examination of both the demand for and supply of index bonds in the private sector. The question of whether the government ought to issue index bonds, either "earmarked" for pension funds or available in an unrestricted fashion, is then addressed. An analysis of the general impact on the Canadian financial system of the issuance of index bonds by the public sector, as well as the implications for the conduct of monetary policy, is included in this discussion.

2. The Experience of Four Countries: France, Brazil, Finland and Israel

The (perhaps) widespread notion that private firms have been active participants in the market for index bonds in countries where such markets exist does not appear to withstand closer scrutiny. Consider first the cases of France and Finland, which are the most easily summarized. As Brenner (1977) notes, "index" bonds in France - whether issued by the government, subsidized industries or private firms - were never linked to the general price level, but only to the prices of specific goods. Indeed, linking interest payments

to the general price level appears to have been illegal based on court interpretations of a nineteenth century statute. Specific-price-linked bonds are really financial hybrids, possessing characteristics of both traditional bonds and equities. Further, private firms generally preferred to link their interest payments to distributed profits or other measures of earnings, so that even "specific-price" indexation was not really common in the private sector. The issuance of these hybrid issues was declared illegal in 1958 as a part of a new economic stabilization program. In Finland, as noted by Paunio and Suvanto (1977), the government issued both index and traditional bonds from the end of World War II to 1968. The index bonds, however, provided only partial compensation (usually 50 percent) for movements in the consumer price index, and payments were made only after the price index had risen by at least 4 percent. There is no evidence that private firms either issued index bonds or borrowed indexed from the banks, although some apparently borrowed on a partially linked basis (25 or 50 percent) from the Finnish government. In 1968, after the 24 percent devaluation in the previous year, the Finnish Government ended all indexation in response to complications posed by the (presumed) adverse change in the terms of trade and rising import prices.

On the basis of the observations of a number of authors (Brenner[1977], Kleiman [1977], and Patinkin [1977]), one can draw a number of important parallels between the Brazilian and Israeli experiences with indexed financial instruments. Three key points emerge: (1) index bonds were introduced following periods of exceptionally high inflation in which interest rate ceilings

virtually assured the collapse of the (undeveloped) capital markets; (2) the main issuer of index instruments has been the government, the dominant financial intermediary, which often relends the funds so obtained to private firms at nominal interest rates; and (3) private firms have not issued index bonds nor have they been willing to borrow indexed from private creditors. These points are amplified in turn.

Index bonds were first issued in Brazil in 1964, following a two-year period in which inflation averaged more than 70 percent and in which a legal interest rate ceiling of 12 percent existed (Brenner, p.5). Index bonds were introduced in Israel in 1954, following a period (1950-1953) in which inflation averaged 23 percent and where the legal interest rate ceiling was 9 percent (Brenner, p.5). Index bonds thus appeared in both countries at a time in which even a smoothly functioning and developed capital market could not have responded to inflationary forces by incorporating an appropriate inflation premium into the structure of nominal yields.

In both Israel and Brazil, governments have borrowed extensively from the private sector by issuing index bonds, but the loans which they subsequently make to private firms are often at nominal rates or only partially indexed. In the mid-1960's, for example, the Israeli government effectively abandoned its policy of indexing loans from its development budget, and has only raised the nominal rates on such loans with reluctance during recent years of high inflation (Patinkin, p.183). In Brazil, as both Patinkin (pp. 183-184) and Kleiman (p. 163) note, most government loans to the private sector - the

popularity of "monetary correction" notwithstanding - are not really indexed. Not only are loans to certain industries not subject to "monetary correction", but the extent of "monetary correction" is often limited to ensure that the correction will fall short of the inflation rate and/or the term "monetary correction" is applied to loans which bear a higher, fixed nominal rate independent of the subsequent course of inflation. Although the policies of both governments presumably relate to various development goals, the fact nonetheless remains that both have operated as financial intermediaries in which they have borrowed indexed and lent nominal.

Finally, private firms in both countries neither issued bonds linked to the general price level nor borrowed indexed from private creditors. To a large extent, the availability of loans from the respective governments at attractive nominal rates precluded the need for firms to issue index bonds. To the extent that firms were willing to borrow on a fully indexed basis from the government, there appears to have been the belief - consistent with the thrust of government policies - that they would not be held to the terms of their contracts should the burden imposed by subsequent inflation prove too onerous. (Following the 67 percent devaluation in 1962, for example, the Israeli government retroactively reduced the required payments on certain of its development-budget loans which had been linked to the official exchange rate of the U.S. dollar.)

The analysis of the experience of the several countries is limited by the need to rely on second-hand sources and by the sketchy detail of the operations of the respective capital markets available to the English-speaking

reader. What clearly emerges, however, is that private firms have not exhibited a willingness to issue bonds indexed to the general price level in any of the four countries cited in popular discussions of indexed financial instruments. From the perspective of the well-developed capital markets in North America, two conclusions stand out. First, the non-issuance of index bonds by private firms in the several countries cannot be assigned much significance, given the options - including nominal loans at attractive yields from the government - available to them. Second, the innovation inherent in the introduction of index bonds in Brazil and Israel took place in periods in which - largely due to legal interest rate ceilings - alternative responses of the capital market to inflation were virtually prohibited.

3. Index Bonds in the Private Sector

There is perhaps too quick a tendency for economists to attribute the non-issuance of index bonds in North America to a combination of (1) the limited experience with double-digit inflation and (2) the ability of a well-developed capital market to achieve much of the necessary adjustment for inflation without recourse to indexation. A more thorough treatment of this issue requires a detailed examination of both the demand for and supply of index bonds in the private sector.

The Demand for Index Bonds

The crucial question to be asked regarding the demand for index bonds is whether the market would price them to yield a real return which is larger

or smaller than the ex ante real return on traditional bonds of comparable maturity, risk and so forth. If the evidence were to suggest that index bonds could be sold at a lower ex ante real rate, the importance of supply factors in explaining their non-issuance would be accentuated.

A number of authors (Blinder [1977], Fischer [1975], and Siegel and Warner [1977]) have employed standard portfolio theory to analyze the demand for index bonds. The demand for index bonds must be considered in the context of the household's total portfolio of real and financial assets, as modern portfolio theory emphasizes the fact that an asset's marginal risk - or its contribution to the risk of a total portfolio - is the key determinant of its equilibrium return. The equilibrium real return on an index bond will thus depend on the inflationary hedge properties of the alternative assets - equities, traditional bonds and human capital - which comprise the portfolio of the representative household. The issue is perhaps most easily seen in the context of the capital asset pricing model (CAPM), a thorough treatment of which can be found in most modern textbooks in finance. The CAPM indicates that, in equilibrium, the ex ante expected return on any asset is equal to the risk-free rate plus a risk premium related to the asset's covariance with the market portfolio. In this model, the risk-free rate corresponds to the return on a (default-free) index bond. Consider now the equilibrium real return on traditional bonds. Since the real return to traditional bonds is inversely correlated with unanticipated inflation, the covariance between the return on these bonds and the market portfolio will be positive - and hence the ex ante real return on traditional bonds will be higher than the risk-free

(index bond) rate - if the real return on the market portfolio is also negatively correlated with unanticipated inflation, and conversely.

For the representative household, the main assets in its portfolio - excluding fixed-income securities - are equities and human capital, and hence the relationship between the ex ante returns on index relative to traditional bonds depends largely on the inflationary hedge properties of these two assets. As emphasized earlier in this report, the evidence for both Canada and the United States strongly suggests that the real return to equities is negatively correlated with unanticipated inflation. Evidence regarding the inflationary hedge properties of human capital is more difficult to obtain. Blinder (1977) addresses this issue, recognizing that it is the short-run correlation between the real return on human capital and unanticipated inflation which is the theoretically relevant issue. His admittedly crude tests with U.S. data for the period 1948-1975 indicate that the rate of change of average earnings - his proxy for the returns to human capital - is negatively correlated with unanticipated inflation. This result draws intuitive support from the fact that cost-of-living clauses are far from universal in labour contracts, which suggests that unanticipated inflation will depress real wages for - at least - the large number of individuals who work under labour contracts without full cost-of-living protection. In short, the empirical relationships which economic theory identifies to be the crucial determinants of the ex ante return on index relative to traditional bonds suggest that index bonds could be issued at lower ex ante cost to the borrower.

The conclusion from modern portfolio theory that index bonds are likely to be priced by the market at a lower ex ante yield than traditional bonds is a highly intuitive one, and is consistent with the interest shown by pension fund managers (among others) in the possible issuance of index bonds by private corporations. The possibility that examining the experience of those countries in which both traditional and index bonds exist might shed further light on this question is unfortunately not very high. The fundamental conceptual problem is that the differences in their calculated yields reflect both price expectations and any difference in their ex ante real returns attributable to risk considerations. Any difference in the ex ante real return could be extracted only by postulating an expected inflation rate corresponding to the maturity of the bonds. (In fact, researchers have frequently done the opposite. Cukierman and Karni (1976), for example, extract the price expectations implicit in the prices of traditional and index bonds in Israel by implicitly assuming that there is no difference in their ex ante real returns.)

The Supply of Index Bonds

In the capital asset pricing model, and hence in the formal analysis of the demand for index bonds, households are simply assumed to have mean-variance utility functions. Modern portfolio theory indicates that a firm, seeking to maximize its present value, will concern itself with the variance of its earnings because of the real economic costs of bankruptcy (i.e., the difference between the value of the firm as an on-going concern and the liquidation value of its assets). In determining its optimal debt/equity ratio, the firm must

weigh the marginal benefit of the tax subsidy associated with debt financing against the marginal cost of the increased probability of bankruptcy. If the firm can reduce the variability of its earnings and thus the likelihood of bankruptcy, then it can increase its debt/equity ratio and thus its access to the tax subsidy, leading to an increase in its market value. Thus firms, seeking to maximize their market value, will act as if they were "risk averse". Note also that if a firm were "risk neutral", its sole concern would be with the ex ante cost of index versus traditional bonds, and hence - given the conclusion of the previous section - such a firm would prefer to issue index bonds.

In general, a representative firm's desire to supply index bonds will depend on the correlation of the real returns on its assets with unanticipated inflation. For simplicity, consider the case where (1) traditional and index bonds co-exist and have the same ex ante return and (2) the real return on the firm's assets (before interest payments) is neutral with respect to unanticipated inflation. In this case, the firm will clearly prefer to issue index rather than traditional bonds since, by so doing, it can insulate its real earnings from unanticipated fluctuations in the rate of inflation. If it were to issue traditional bonds, then its real earnings would rise with unanticipated inflation - which reduces the real cost of the firm's debt - and fall with unanticipated deflation. Clearly, however, the attractiveness to firms of supplying index rather than traditional bonds at (for simplicity) the same ex ante cost is no longer certain if the real returns to the firm's assets

are not neutral with respect to inflation, as is likely to be the case if the firms hold nominal assets such as money (Liviatan and Levhari [1977]).

Fischer (1976) presents a more formal model in the spirit of the preceding discussion which readily identifies the correlation between a firm's earnings gross of interest payments and unanticipated inflation as the key variable determining the likelihood of a firm's issuing index bonds. To provide empirical evidence on this issue, Fischer then examines the correlation between the deviations of (adjusted) real after-tax earnings from their trend values and the deviation of the price level from its trend values for a representative sample of 16 large U.S. firms for the period 1954 to 1973. For 11 of the 16 companies, the correlation was negative. The largest of the five positive correlations was only .32, while the largest (absolute value) of the negative correlations was -.88. These results are, of course, only suggestive and invite the question of whether a more refined analysis over a larger universe of firms would yield comparable results. Factors which could contribute to the observed tendency toward negative correlations include, for example, cost-push inflationary forces (i.e., unanticipated inflation associated with a decline in the domestic production of goods and services) and the tax treatment of inventory profits and depreciation allowances in an inflationary climate.

The preliminary results cited above suggest that the real returns to the assets of a large number of firms may be adversely affected by unanticipated

inflation. As emphasized, a positive correlation between real (interest adjusted) earnings and unanticipated inflation would appear to be the major requirement for the index bond alternative to be attractive to a representative firm. At the same time, however, there are clearly some firms for which such a positive correlation exists and thus for which the index bond alternative should in principle be attractive. For this reason, standard portfolio theory does not appear to provide an adequate explanation of the complete non-issuance of index bonds by the private sector in North America.

Economists have thus been forced to look for alternative theoretical explanations of the conundrum posed by the non-existence of index bonds. One explanation focuses on the ability of sophisticated capital markets to provide substitute adjustments which - from the viewpoint of the firm - dominate the index bond option. The most obvious example is the existence of the call option, which provides firms with the option of redeeming their debt on specified terms before maturity but after a designated period of time, usually not less than 5 years. If unanticipated deflation occurs and nominal interest rates subsequently decline, the issuer can redeem the bonds and thus reduce his exposure to risk in this regard. At the same time, the fixed coupons associated with traditional bonds protect the corporation from unanticipated inflation and hence increases in the nominal interest rate. As Fischer (1976) emphasizes, however, traditional bonds with call protection are not perfect substitutes for index bonds since the call feature exposes the firm to risks associated with unanticipated deflation for a specified period of time.

Further, the call option itself requires cet. par. the firm to offer a higher return on its bond issues. To date, firms appear to have preferred this response to inflation uncertainty rather than the "open-ended" commitment associated with index bonds. Since the analysis of the demand for index bonds suggests that they could be issued at a lower ex ante cost than traditional bonds, and since the attachment of the call option will raise the required yield on traditional bonds further, the availability of call protection also cannot explain the complete non-existence of index bonds.

A second argument that economists have put forward is that a firm, even if it believes that the market will ultimately price index bonds at a lower ex ante yield, cannot be confident that the first firm(s) to innovate in this regard will benefit from this cost saving. To innovate may impose additional costs on the firm since information must be disseminated to potential investors, and there are likely to be additional costs in resolving issues such as the tax status of indexed interest payments and the legal requirements of the prospectus itself. The likely existence of educational costs is evident, for example, in the tendency for borrowers to standardize their indentures in order to facilitate their evaluation by potential investors. The argument regarding innovation costs appears to have some merit and could, in principle, justify government intervention in the educational process, including the clarification of tax and other legal uncertainties.

A third economic argument relates to potential asymmetry in the manner in which firms regard the possibility of dramatic unanticipated inflation on

the one hand, and dramatic unanticipated deflation on the other. If the possibility of the former dominated the latter in the view of corporate borrowers, index bonds would not appear to be attractive, especially since no firm could assume that its real earnings (before interest payment) would be perfectly insulated from inflation. Indeed, received macroeconomic theory provides some support for this viewpoint, since (1) the short-run employment loss associated with a dramatic reduction in the rate of inflation is predictably high and (2) the government retains through its control of the money supply the ability to determine the rate of inflation, including the option of preventing too sharp a decline if the resulting rise in unemployment were viewed as politically unacceptable.

To provide an institutional perspective on these economic arguments, the author talked to a number of individuals in the Canadian investment community. Their comments reinforced certain of the theoretical issues noted previously and raised a number of additional points. The main argument from portfolio theory - that the crucial question is the extent to which the firm's real earnings (after interest adjustments) is affected by inflation - was anticipated. The response, however, was not that those firms whose real earnings are the least affected by inflation would be the most likely to introduce index bonds, but rather that <u>even</u> these firms could not undertake the "open-ended" commitment inherent in the issuance of index bonds. The repeated references to this "open-ended" commitment provides implicit support for the asymmetry argument noted previously, since no executive referred to a corresponding risk associated with the issuance of traditional bonds. Frequent

references were also made to innovation costs likely to be incurred by the first issuer, together with the recognition that Canadian firms were far more likely to be receptive to index bonds if they were introduced first in the United States.

The financial executives also made reference to a number of points not cited in more theoretical treatments. Most importantly, several emphasized their belief that so long as a corporation had the option of marketing traditional debt, no serious consideration would be given to the index bond alternative. In particular, this response suggested that most corporations had not entertained the notion of index bonds seriously enough to warrant their investigation of the possible ex ante cost saving associated with index bonds. The repeated reference to the "open-ended" commitment dominated discussions of cost considerations. Attention was also drawn to the fact that a corporation which had chosen to issue index bonds in (say) the early 1970's was likely to have incurred higher cost than if it had issued traditional bonds. Although the widely-accepted view that much of the inflation of the 1970's was unanticipated gives credence to this argument, no reference was given to the crucial distinction between ex ante and ex post costs. At least one underwriting firm gave consideration to the index bond alternative in 1974 on the basis of cost considerations, but only because it felt that the price expectations being built into nominal interest rates at that time were too high. This argument does not, however, correspond to the theoretical concern with the ex ante cost of index versus traditional bonds, since it

focuses on the likelihood that the market's implied forecasts of inflation are simply incorrect.

To sum up, there emerged a clear consensus among the executives interviewed that no Canadian corporation was likely to give serious consideration to the index bond alternative, at least under present market conditions. If inflation were to accelerate once again to the double-digit level, index bonds would probably receive renewed attention. If a corporation could still market traditional debt, even if it had to provide extendible/retractable options to the investor in order to do so, the index bond would be likely to remain a rather remote alternative.

Overview

Although the market - once it has adjusted to their existence - is likely to price index bonds at a lower ex ante yield than traditional bonds, there appears to be little likelihood that private corporations in Canada will introduce index bonds in the foreseeable future. Both economic theory and financial "pragmatism" identify at least two key factors which may ultimately underlie the complete non-issuance of index bonds: (1) the cost imposed on the first firm(s) who innovate in this regard and (2) the asymmetry with which potential issuers may view the likelihood of dramatic unanticipated inflation on the one hand, and dramatic unanticipated deflation on the other. As noted, the former represents a potential rationale for the government's taking the initiative in assuming the "education" costs associated with this innovation, as well as eliminating uncertainty surrounding related tax and regulatory matters.

The non-issuance of index bonds by regulated public utilities is worthy of special note. If a regulated utility is permitted to pass through higher costs to its consumers, then it would appear to be in an ideal position to issue index bonds and thus exploit the long-run cost saving likely to be associated with their issuance. The utility's consumers, who become de facto index borrowers, are the ultimate beneficiaries of the expected cost saving. The non-issuance by regulated utilities is thus especially puzzling, and may provide additional support to the argument that innovation costs represent an important deterrent to the introduction of index bonds.

Finally, the suggestion has been made (Blinder [1977], Friedman [1976]) that firms would prefer to issue bonds linked to the price of their specific products rather than to the price level as a whole, presumably on the assumption that specific prices are likely to be more highly correlated with the firm's earnings than is the general price level. Blinder proposes the creation of a "National Inflation Mutual Fund" which would purchase bonds indexed to the prices of individual industries and sell bonds indexed to the general price level. Friedman offers a proposal similar in spirit, in which investment bankers would play a major role in "packaging" the specific-price linked bonds and in which life insurance companies would represent the vehicle by which small savers would ultimately obtain access to bonds linked to the general price level. Friedman carefully details the incentives to the three participants - business corporations as ultimate borrowers, individuals as ultimate savers, and life companies as financial intermediaries - and acknowledges that government encouragement (at the least) is probably necessary if the proposal is to be made operational.

Both proposals suggest, in effect, the attractiveness to corporations of employing a financial instrument which is a hybrid between traditional bonds and equities. The fact that individual firms may prefer to issue bonds linked to their industry prices rather than to the general price level does not, however, provide additional perspective on why no firms have issued index bonds. In particular, if a firm chooses to issue traditional rather than index bonds, its interest payments are linked to the expected movement in the general price level by virtue of the existence of a corresponding inflation premium in the level of nominal interest rates. Alternately, Canadian firms such as Eaton's and Simpson Sears - whose "industry" price movements will closely parallel those of the consumer price index - have shown no inclination to issue index rather than traditional bonds. Further, as noted by Brenner (1977), private corporations in France preferred to link interest payments directly to earnings rather than to product prices, and apparently found investors willing to purchase the resulting bonds.

Although the Blinder and Friedman proposals represent an interesting variation on the index bond theme, their implementation - even in the United States - would presumably require some government promotion. Government encouragement, in turn, could be justified either as (1) an attempt to protect the smaller saver from income redistributive effects which might otherwise occur in response to unanticipated inflation and/or (2) an attempt to increase the pool of long-term financial capital and thus promote real capital formation objectives. Both the open nature of the Canadian economy and the relatively small number of corporate borrowers would, in addition, complicate

the implementation of either scheme in Canada.

Finally, as should be evident from the preceding discussion, the fact that private firms are reluctant to index pensions does not provide de facto evidence of their reluctance to issue index bonds. The former are required by law to be funded by a well-defined set of assets, chiefly equities and fixed-income securities, whose real returns are likely to be adversely affected by unanticipated inflation. The assets which would be financed by the sale of index bonds, on the other hand, would likely consist of plant, equipment and other capital goods whose real return might well be positively correlated with unanticipated inflation. As Fischer's results indicate, this positive correlation would appear to exist, at least for some corporations.

4. The Issuance of Index Bonds by the Public Sector

If the private sector is either unwilling or unable to issue index bonds, the question of whether the public sector ought to innovate in this direction is inevitably raised. Government issuance of index bonds could be rationalized in terms of equity, with the government seeking to protect a certain class of economic agents from the arbitrary redistributive effects of unanticipated inflation. The need for government intervention in this form, in turn, could be related to the "market failure" underlying the non-issuance of index bonds by the private sector. Even if these arguments are accepted, however, there remains the issue of whether this form of government intervention is to be preferred. If the major reason for non-issuance of index bonds were the

information costs imposed on private innovators, the elimination of these start-up costs might well be a more appropriate response. Alternatively, if the fundamental issue turns out to be the inability of the private sector to underwrite inflation risk, there might be more efficient ways in which the government could underwrite this risk.

The fact that the ultimate rationale for government intervention pertains to income redistributive goals must be emphasized for at least two reasons. First, a number of political or sociological arguments - such as the impact on the government's willingness to conduct responsible (i.e., noninflationary) monetary policy - often dominate the index bond debate. Second, Levhari and Liviatan (1976) have noted that the issuance of index bonds by the government makes the representative household an index borrower - by virtue of its attendant tax liabilities - as well as an indexed lender. Their major point, that the set of portfolio opportunities available to the representative household may not be expanded if the government were to issue index bonds, ceases to be a major concern once the income redistributive rationale for government intervention has been established. Alternately, a formal model which focuses on the concept of a representative household ceases to be a useful tool when the ultimate goal of policy is income redistribution. Finally, there are a number of peripheral goals which might be invoked to rationalize the issuance of index bonds by the public sector. In particular, the potential impact on both the level and composition of saving could

legitimately be raised. These concerns are not addressed in this study, however, since it appears to be clear that the prime concern lies with the elimination of certain of the redistributive effects of inflation, rather than with the impact on economic behaviour of the elimination of these risks.

As previously noted, the relevance of the experience of Brazil and Israel is limited by (1) the existence of well-developed capital markets in Canada and (2) the absence of money illusion which combine to produce much of the inflation adjustment that indexation seeks to accomplish. Nonetheless, the experience of these countries is useful on two accounts. First, the linked portion of the interest payments and/or principal on government index bonds is not taxed in either country and invites the question of the tax treatment to be accorded such bonds if issued in Canada. Second, the governments in these countries - partly due to development objectives - play the role of major financial intermediaries, largely borrowing indexed and lending nominal. This fact raises the question of whether such a role might inadvertantly emerge for the Government of Canada should it (for example) seek to accomodate all private sector demand for index bonds.

The experience of both the United Kingdom and the United States also merits comment. Index bonds were recently introduced on a very limited scale in the U.K. and - as in Brazil and Israel - the inflation adjustment is not taxed. (From the limited information available, the present author could not determine the real yield on these government bonds, which might very well be zero.) The apparent lack of expansion of government involvement in this sphere

can undoubtedly be traced in part to the pension legislation enacted in 1975 in which the government - as already noted - effectively chose to underwrite inflation risk for pension plans using insurance principles. In the United States, where the government has not issued index bonds, Senator James Buckley of New York introduced in April of 1974 a "Cost of Living Adjustment Act" which provided for the indexation of interest and principal on savings bonds, savings certificates and other U.S. Government obligations with a maturity of one year or over. The proposed legislation, which closely parallels the recommendations of Milton Friedman (1974), elicited little interest from the Treasury Department. Once again, however, the fact that U.S. Social Security - with fully indexed benefits - represents a much larger portion of the retirement income for the representative household than does its Canadian counterpart (the C.P.P.) must be noted. The U.S. Government is underwriting via Social Security a much larger fraction of the inflation risk associated with total - public plus private - pension income in the United States, and the rationale for the government's issuing index bonds is reduced accordingly.

There would appear to be at least four major issues surrounding the issuance of index bonds by the public sector. Should index bonds be issued in amounts corresponding to government financing needs or should they be issued in "unlimited" amounts, perhaps earmarked for private pension plans? What should be the appropriate tax treatment of index bonds? How would financial markets be affected by their issuance? And finally, how would index bonds affect the conduct of monetary policy, especially in view of the open

nature of the Canadian economy? These questions are briefly analyzed in turn.

The Volume Question

In its standard financing operations, the Government of Canada first determines its gross borrowing needs and then sets the terms of the debt issue in accordance with market conditions. If this approach were taken with respect to index bonds, the government would still have to choose between (1) permitting only designated purchasers to acquire the bonds, perhaps in restricted amounts and (2) imposing no restrictions on their purchase. If the first option were chosen, as in the case of Canada savings bonds, the market-clearing yield would be higher in view of the restrictions on the effective demand for the bonds.

If index bonds were issued in the same manner as traditional bonds and were thus tailored in volume to the government's financing needs, then (1) the disruptive influence on the Canadian financial system would be minimized but (2) plan sponsors could only gradually acquire the volume of index bonds necessary to permit them to provide indexed pensions and yet remain actuarially sound. These points merit amplification.

Assume, for illustrative purposes, that the government is able to set the terms on an issue of index bonds so as to generate the exact demand necessary to absorb the debt issue, with no restrictions on potential purchasers. (Note that the market-clearing real return could in principle be zero or negative.) In this case, the disruptive influence on the Canadian financial

system would be minimal, as the index bonds would simply replace - in the aggregate - an equivalent volume of traditional government bonds in household and other portfolios. Some changes in relative yields would, of course, be a likely byproduct of the attendant portfolio realignments.

Clearly, however, the above procedure would not make available a sufficient number of index bonds - at least initially - to enable plan sponsors to provide indexed benefits and yet remain actuarially sound. At the end of 1976, for example, the assets of trusteed pension plans (alone) in Canada stood at almost $25 billion, far in excess of the gross financing needs of the Federal Government in any given year, at least to date. If, as would appear likely, the government were to impose restrictions on the purchase of the index bonds by earmarking them for pension funds (including RRSPs), the result would not change significantly. Trusteed pension plans at present hold only a small fraction of their assets in the form of Government of Canada bonds. At year-end 1976, only 2.5 percent of their funds were so invested. The acquisition of index bonds by trusteed pension plans would thus be mirrored in a rechanneling of funds away from the markets for equities and traditional fixed-income securities. Again, as portfolio realignments took place, some changes in relative yields could be anticipated.

If index bonds were gradually introduced by this means, and if the total outstanding Federal Government debt exceeded at every point in time the total assets of pension funds, the latter <u>in principle</u> could eventually acquire

sufficient index bonds to enable them to provide indexed benefits. (There can be, of course, no presumption that pension plans would wish to hold only index bonds if sufficient index bonds were available to them. The optimal composition of each portfolio will ultimately reflect the plan's willingness - as always - to trade off expected return for risk. Since a (short-term) index bond of the Government of Canada would correspond to the risk-free asset of the capital asset pricing model, the ex ante return on a portfolio consisting solely of government index bonds would be less than that on any other portfolio.) Note also that no private firms would be "forced" to issue index bonds in order to permit them to compete with the government for funds since (1) the index bonds would simply replace traditional government bonds which would otherwise be held in household and other portfolios and (2) the aggregate volume of saving - as a first approximation - is not likely to be affected.

If, however, the government wanted to issue index bonds in sufficient quantity to facilitate the immediate move to indexed pensions for members of either defined benefit or money purchase plans, the situation would be more complicated. In principle, the government would have to set the terms on its index bond issue and stand ready to sell the amount demanded by plan managers, again on the assumption that their purchase would be so earmarked. In theory, such plans could end up holding only index bonds. In fact, the substitution within plan portfolios would depend crucially on the return provided by the index bonds, together with the changes in relative yields that occurred as plan managers sought to dispose of existing assets. If the net demand were

to exceed the government's borrowing needs, the government would find itself in the role of a financial intermediary. In effect, the Federal Government would be borrowing indexed and lending nominal, perhaps initially by repurchasing some of its outstanding debt. To the extent that the government found itself purchasing other assets, perhaps to support their prices in a period of changing relative yields, the expansion of its influence would be apparent. If, in addition, the sale of index bonds were to generate excess funds to the Federal Government beyond the amount that could reasonably be used to repurchase its outstanding (marketable) debt, the Federal Government would have to expand its intermediary role and acquire alternative assets, perhaps - by formula - provincial debt. Again, the potential expansion of government influence on financial markets is readily apparent.

The potentially dramatic impact on the Canadian financial system that could occur if the Federal Government were to make index bonds available in unlimited amounts must be acknowledged. In the extreme, this option could lead to (1) a sharp change in relative yields on alternative assets, which - in turn - could give rise to large windfall gains or losses to certain classes of investors and (2) an expansion of government financial intermediary activities. The Federal Government could mitigate these affects by offering less attractive yields on the index bonds and/or maintaining the right to arbitrarily terminate the sale of the bonds after a designated point. The fundamental dilemma, however, surfaces again: if the issue is acquired in

large volume by pension funds, then the potential impact on the Canadian capital markets could be significant; if the issue is not acquired in large volume, then the progress toward facilitating the indexation of benefits is correspondingly reduced.

Finally, the fact that the widespread issuance of index bonds should reduce the long-term cost of Federal Government borrowing - at least for a given maturity structure - must also be noted. This proposition reflects the fact that the inflation risk characteristics of existing assets suggest that households - either directly or through financial intermediaries - would be willing to hold index bonds at a lower ex ante yield than they would require on traditional bonds.

The Tax Treatment of Index Bonds

At present, Canada taxes both the real interest and inflation components of interest income. The issuance of index bonds would undoubtedly serve to emphasize the fact that the inflation component is more appropriately viewed as the revision of the nominal value of the capital base rather than as interest income. As a result, their issuance is likely to be accompanied by considerable pressure for the exclusion from taxable income of the "monetary correction", at least if the bonds are made available to purchasers whose incomes are not tax exempt. If the linked payments of index bonds were made tax exempt, then the argument that the inflation component of all interest income should not be taxable (nor deductible to the issuer) would also be raised. Indeed, as discussed in Pesando (1977), attention would be focused on all the distortions caused by inflation under the present tax system, with attendant pressure for their removal.

The question of tax reform in an inflationary climate is clearly beyond the scope of the present study, although it is important to note that the issuance of index bonds by the Federal Government would focus renewed attention on this debate. In addition, if the "monetary correction" were not excluded from the taxable income of investors, then the form in which index bonds were issued would become important. At present, two options exist regarding the design of index bonds. In the first, index bonds would bear coupons redeemable for the face amount multiplied by the relevant price ratio, and bear a maturity value equal to the face amount similarly multiplied by the relevant price ratio. In the second, the holder would receive in each year an interest coupon together with a payment to compensate him for the decline in that year in the real purchasing power of both the principal and the interest coupon, and would receive only the face value of the bond at maturity. The latter option, which parallels the manner in which the investor is compensated for inflation when he holds traditional bonds, would clearly be required if no changes were made in the tax treatment of interest income. Under the first option, the lender would be faced with a prohibitive increase in his tax liability in the year that his bonds mature.

The Impact on Financial Markets

The fact that the major impact of the issuance in large volume of index bonds would be on relative market yields has already been noted. As portfolios are realigned, relative yields would change under the reasonable assumption that different financial assets are not viewed as perfect substitutes by

market participants. To the extent that pension funds are selling existing assets to obtain additional funds, the relative yields on these assets might rise and thus force fund managers to assume a "one-shot" loss in their attempt to buy a greater degree of inflation neutrality for their investment portfolios. These higher relative yields would presumably be required to entice other participants to acquire the assets, and the magnitude of the initial yield changes is likely to vary inversely with the rapidity with which the portfolio realignments take place.

The scenario discussed above, including the possibility that the Federal Government would be forced to assume an enlarged role as a financial intermediary, could be "fleshed out" in considerable detail. In view of the fact that such an exercise would be quite speculative, together with the tentative conclusion of the present author that an alternative means for the Federal Government to underwrite inflation risk is preferred, this exercise is not pursued. Two points regarding the issuance of index bonds by the private sector are worthy of note, however. The first is that the introduction of index bonds by the government would eliminate most of the start-up costs associated with this innovation. To the extent that these costs have inhibited individual firms from more seriously exploring the index bond alternative, this obstacle to their introduction in the private sector will have been removed. The second point is that, even in the extreme case where the Federal Government finds itself in a new intermediary role, no private firms would be "forced" to issue index bonds in order to "compete for funds". So long as the aggregate level of domestic saving is unaffected by this innovation and so long as certain

borrowers continue to have access to foreign markets, the volume of loanable funds that can be raised by the private sector via traditional debt instruments should not be adversely affected.

The Implications for Monetary Policy

If only the Federal Government were to issue index bonds, presumably earmarked for pension funds, both the conduct and impact of monetary policy would be substantially unaltered. Even if the private sector were to respond to the government's initiative by introducing index bonds on a wide scale, which is probably unlikely, no major problems are readily apparent. From the monetarist perspective, the control of the money supply and its use as the target for monetary policy are not likely to be impaired. From the Keynesian perspective, real and nominal interest rates - on the assumption that markets for index and traditional bonds co-exist - would be free to vary, and both (as is presumed) would exert some impact on aggregate demand.

Further, the open nature of the Canadian economy and the importance of international capital flows would not appear to greatly complicate the matter. In the absence of index bonds, long-term capital flows are likely to be geared - in effect - to real interest rates in the two countries, at least if exchange rate expectations are based primarily on purchasing power parity considerations. The introduction of index bonds would complicate the decision of the foreign investor to the extent that he has to consider (1) what premium he is willing to pay to eliminate inflation risk in Canadian-denominated assets, and (2) the extent to which exchange rate movements may not coincide with changes in the rates of inflation in the two countries. In all likelihood, the co-existence

of index and traditional bonds in the domestic market would be mirrored in international transactions in both traditional and index bonds.

Clearly, the implications for monetary policy of the introduction of index bonds by the Federal Government could be analyzed in great detail. In view of the opinion of the present author that this is not the preferred route to follow if the goal is to facilitate indexation by private pension plans, no such extended analysis is attempted here.

5. Summary

At present, private firms in Canada do not appear to be willing to issue index bonds, although the reasons for this reluctance remain speculative. The Federal Government's decision to issue index bonds would lead to a fundamental dilemma. If the index bonds were issued in sufficient volume to enable pension plans to offer indexed benefits, the potential impact on the Canadian financial system would be quite dramatic and could include an expanded role for the Federal Government as a financial intermediary. If the index bonds were issued on a more limited scale, perhaps to conform to the Federal Government's financing requirements, the impact on the financial system would be reduced, but the ability of private plans to provide indexed benefits would be greatly delayed. If innovation costs were the prime deterrent to the issuance of index bonds by the private sector, the initiative by the Federal Government might encourage some private firms to follow suit. So long as the level of domestic saving and access to foreign markets were not significantly affected, as is likely to be the case, no private firms would be "forced" to issue index

bonds in order to compete for funds with the Federal Government.

On balance, the present author is of the opinion that the issuance of index bonds by the Federal Government is not the preferred means to facilitate the provision of indexed benefits by private pension plans. An alternative approach is presented in the concluding chapter of this report.

V. AN ALTERNATIVE APPROACH: ANNUITIES (CURRENT OR DEFERRED) PURCHASED AT REAL INTEREST RATES AND GOVERNMENT INSURANCE AGAINST UNANTICIPATED INFLATION

1. Introduction

The preceding chapters have highlighted two major limitations of private pension plans in an inflationary climate. The first is the lack of portability of defined pension plans and the recognition that, even if the terminating employee is vested, the deferred annuity to which he becomes entitled is likely to be seriously eroded by inflation during his pre-retirement years. The second is the apparent inability of sponsors of defined benefit plans to commit themselves to contractual indexation during the post-retirement period, and the parallel inability of members of money purchase plans to acquire indexed annuities from life insurance companies.

The earlier discussion also indicates that, at least to date, only the central government has appeared to be willing to underwrite the risks associated with unanticipated inflation. In Canada, the C.P.P. and O.A.S. are both indexed and underwritten by the taxing powers of the Federal Government, as is the Public Service Superannuation Plan for federal civil servants. In the United States, an analogous situation exists with respect to Social Security, which - significantly - represents a much more important component of the representative household's retirement income than does its Canadian counterpart, the C.P.P. The introduction of the Social Security Pensions Act of 1975 in the United Kingdom also illustrates this government's recognition of the difficulties

faced by the private sector in underwriting inflation risk. Plan sponsors who "contract out" of the new state scheme still make contributions to the state plan, and the state - in turn - assumes the costs of indexing the pensions promised to the private plan's members, at least up to the "guaranteed minimum pension". The insurance principle is even more apparent in the options provided the private plan sponsor to pay for the cost of the (required) indexation of the benefits of terminating employees with five years service. A key alternative provided plan sponsors is to make a lump sum payment to a national insurance fund when the employee leaves which then limits the sponsor's "indexing" liability to 5 percent per year.

Finally, the preceding analysis indicates that a well-developed capital market will make much of the adjustment for inflation that indexation seeks to accomplish. To date, no Canadian firms have issued index bonds, nor are they likely to do so in the foreseeable future. Demand considerations, however, do suggest that potential borrowers could issue index bonds at a lower ex ante cost than traditional bonds, at least after the market has adjusted to their existence.

These three sets of observations form the basis for the proposal, set out below, to facilitate the provision by private plans of indexed benefits. The logic of the proposal is sketched in the next section of this chapter, and is followed by a more detailed discussion of certain of its key features.

2. The Proposal: An Overview

Note first what happens when the sponsor of a defined benefit plan purchases a fixed-income annuity for the plan member at the time of his retirement. Consider, for example, the case of an employee who retires at age 65, is entitled to a $10,000 annual pension, and who will live with certainty for an additional 10 years. If there were no inflation, and if the yield on long-term Canada bonds thus approximated its historical real average of (say) 3 percent, the plan sponsor could purchase the annuity for $85,300. If, by contrast, the rate of inflation were 7 percent and projected to remain so for the next ten years, the yield on Canada bonds would rise to 10 percent as an inflation premium of 7 percent is built into the structure of yields. The plan sponsor could thus purchase the required annuity (i.e., a fixed-dollar pension of $10,000 per year for 10 years) for only $61,450. The gain ($23,850) to the plan sponsor is mirrored in the corresponding loss to the retired worker, whose fixed-dollar pension is expected to erode in real terms at 7 percent per year. Inflation is thus redistributing income from the retiree to the plan sponsor. An analogous situation occurs when a plan sponsor purchases a deferred annuity for a terminating employee when the interest rate contains a substantial inflation premium. The cost saving to the sponsor is the present value of the expected decline in the real purchasing power of the fixed-income annuity commencing at the termination date - rather than the retirement date - of the employee.

In fact, the plan sponsor in this example could purchase - for the initial

sum necessary to buy a $10,000 pension in the noninflationary climate - a $10,000 pension in the inflationary climate to be escalated at 7 percent per year, or by the expected rate of inflation at the time the annuity is purchased. If the escalated pension were purchased, the income redistributive effects would be removed: that is, the sponsor would no longer benefit at the plan member's expense. Again, analogous reasoning applies to the case where the sponsor purchases a deferred annuity for a terminating employee.

This simple example serves to illustrate two key points. First, plan sponsors should be purchasing annuities based on a real rate of interest if inflation is not to redistribute income from the member to the sponsor. For the identical sum that he would pay for a fixed-income annuity in a non-inflationary climate, the plan sponsor could purchase the same annuity escalated by the rate of inflation expected at the time the annuity is purchased. Second, the pension that the sponsor could purchase would be escalated at the expected rate of inflation, but would not be fully indexed. If inflation proved to be higher than that expected at the time of his retirement, the plan member would suffer a real income loss during his retirement years; if it were lower, the member would experience a real income gain. Clearly, the pensioner could bear this risk and still be in a position which is significantly better than the situation in which he is now likely to find himself; that is, with a fixed-dollar pension with (likely) ad hoc adjustments at the discretion of his former employer.

The Federal Government could, however, enable the plan sponsor to provide a fully indexed pension by providing insurance against the risk that inflation might diverge from its expected path, or 7 percent in the example. Consider the case where the plan sponsor purchases the indexed pension from a life insurance company which, in turn, has purchased inflation insurance from the Federal Government. If in the first year in which the pension was in force, the actual rate of inflation rose to 10 percent, the inflation insurance fund would transfer 3 percent of $10,000 or $300 to the insurance company. If the inflation rate turned out to be only 4 percent in this first year, the insurance company would transfer a corresponding amount to the Federal Government fund. In subsequent years, payments to or from the fund would be based on the experienced cumulative inflation relative to the cumulative inflation projected on the basis of the 7 percent rate. In a straightforward manner, the same inflation insurance principle could be applied to deferred annuities purchased at the termination date of the employee, whose benefits would then be indexed from this date through his retirement years.

What premiums would the Federal Government have to charge to ensure that the inflation insurance program is actuarially sound? If the market forecasts implicit in the structure of nominal yields are unbiased forecasts of future inflation rates, then premiums need be set only to cover administrative expenses. Would plan members be willing to purchase this insurance which, in effect, would reduce the present value of the indexed pension compared to the (only) escalated one? The analysis of the demand for index bonds indicated

that households would be willing to hold index bonds at a lower ex ante return than traditional bonds. Analogous reasoning suggests that plan members would be willing to pay a premium for a fully indexed rather than an escalated pension; that is, for the Federal Government to assume the risks associated with unanticipated inflation.

For money purchase plans, the analysis is similar to that above. Since the member of a money purchase plan is provided with a lump sum at retirement, which he then uses to purchase an appropriate annuity, no income redistributive effects analogous to those for defined benefit plans occur if nominal interest rates contain a substantial inflation premium. Suppose, for example, that the money purchase plan provided the sum of $85,300 to the member at his retirement age of 65. As in the earlier example, the member would purchase a fixed-dollar pension for $10,000 for 10 years if the rate of interest were 3 percent. If the rate of inflation was expected to be 7 percent, so that the nominal interest rate rose to 10 percent, the member could purchase either (1) a $10,000 pension escalated at 7 percent per year for the 10 year period or (2) a fixed-dollar pension of $13,882 for the same 10 years. For the member of the money purchase plan to buy a $10,000 pension that was fully indexed, then (1) the life insurance company from which he purchased the indexed annuity would, in turn, have had to purchase inflation insurance from the Federal Government and (2) the member would have to provide an additional sum - or receive a slightly lower (but still indexed) pension - in order to pay the premium demanded for the inflation insurance. This example also illustrates

the fact that those plan members who wish to have indexed pensions must be willing to forego high initial fixed-income pensions if interest rates embody an inflation premium.

The principle by which the sale of inflation insurance by the Federal Government would enable sponsors of defined benefit plans to provide indexed annuities - whether current or deferred - has been established. To provide a furthure perspective on this proposal, certain of the more salient issues are analyzed below in greater detail. These issues include: (1) the mechanics of the plan; (2) inflation premiums, nominal yields, and the choice of an appropriate real interest rate; and (3) the cost to plan sponsors relative to the current practice of purchasing fixed-income annuities at nominal interest rates. The advantages (and disadvantages) of this proposal relative to alternative schemes to facilitate indexation, including the sale of indexed annuities or the issuance of index bonds by the Federal Government, are discussed in the concluding section.

3. The Proposal in More Detail

The Mechanics

Assume that (1) the ex ante real interest rate on long-term Canada bonds is constant and known and (2) price expectations are incorporated on a one for one basis into nominal interest rates (i.e., a one percent increase in the expected rate of inflation over a particular time horizon raises the nominal

yield on a bond of corresponding maturity by one percent as well). If the nominal rate on long-term bonds is 10 percent, and if the ex ante real return on long-term Canada bonds is 3 percent, then the expected rate of inflation over the relevant time horizon (say, 15 years on average) is 7 percent. The inflation insurance scheme would operate as follows.

The government would indicate that it stood ready to provide inflation insurance for annuities that were escalated at 7 percent per year. If life companies, for example, were to purchase this insurance, they then would be in a position to sell indexed annuities. How would the marketplace price these annuities? If (1) life companies made no profit on this activity and (2) their only additional cost were the inflation insurance premium which the government set equal to zero, then competition among life companies would ensure that the annuities were sold on the basis of a 3 percent real return. In the context of the original numerical example, a life company would sell a $10,000 indexed annuity with a 10-year life for $85,300, the same amount for which it would sell a $10,000 annuity of comparable duration escalated at 7 percent per year. More realistically, competition among life companies should assure that no "abnormal" profits were made on this activity, and the competitive real return offered on these annuities would be less than 3 percent to reflect the costs associated with the activity, including the insurance premiums charged by the Federal Government.

As noted earlier, payments to or from the government fund would be based on the experienced cumulative inflation relative to the cumulative

inflation projected on the basis of the 7 percent expected rate of inflation. Let P denote the actual rate of inflation in period t. Let y indicate the initial value of the indexed annuity. The nominal value of this pension after n periods (Y_n) will equal $y * (1+P_1)(1+P_2)\ldots(1+P_n)$. The projected nominal value of this pension after n periods (Y_p) is, if the expected rate of inflation is 7 percent, $y * (1.07)^n$. In period n, there will be a payment from the government fund equal to Y_n minus Y_p if the cumulative inflation exceeds that projected on a 7 percent inflation rate or, equivalently, if Y_n is greater than Y_p. Similarly, there will be a payment from the life company to the government fund equal to Y_p minus Y_n if the cumulative inflation is less than that projected on the basis of the 7 percent rate. Two additional points merit comment. First, over reasonably long periods of time, the net payments from the government fund should be zero if the forecasts of inflation implicit in nominal yields are on average correct. Second, payments to or from the government fund would not necessarily indicate that unanticipated inflation had occurred. This result reflects the fact that even if the market is (correctly) anticipating an average rate of inflation of 7 percent over the next (say) 15 years, there can be no presumption that the rate of inflation is expected to equal 7 percent in every year. If, for example, the market (correctly) anticipates the rate of inflation to decline secularly but to average 7 percent, there will initially be payments from the government fund offset by payments to the fund later during the life of the annuity.

Finally, the above discussion has assumed that the plan sponsor purchases

the indexed annuity from a life insurance company. Large employers who prefer to assume the mortality risk would obviously be provided access to inflation insurance as well. If a defined benefit plan had been costed on the assumption that the sponsor could effectively purchase an indexed annuity based on (approximately) a 3 percent real interest rate, these cost projections - in the present example - would be realized. If the assumption had been that an index annuity could be purchased only at a real rate of less than 3 percent, then the costs to the plan sponsor would be less than had been projected, and conversely.

The Inflation Premium and the Choice of the Real Interest Rate

If (1) unbiased inflation forecasts are built into nominal interest rates and (2) the real interest rate can be determined, the inflation insurance scheme described above can be implemented in a straightforward fashion. These points are discussed in turn.

Due to the complications posed by tax considerations, economic theory does not predict that price expectations will be built into nominal interest rates on exactly a one for one basis. In fact, however, empirical studies - although limited by the inherent difficulty in measuring price expectations - do suggest that a one percent rise in the expected rate of inflation will raise nominal interest rates by one percent as well. (See, for example, Pesando [1977] and references contained therein.) Indeed, authors of recent studies (Feldstein [1976] and Gandolfi [1976]) of the impact of tax factors

on the adjustment of interest rates to inflation make reference to the combined influence of tax considerations and/or the probable value of underlying behavioral parameters which might explain the apparent one for one adjustment to price expectations. Further, recent work by Fama (1975) gives credence to the notion that the price expectations implicit in nominal yields are likely to be unbiased predicters of future inflation. Such a conclusion would draw support from the growing evidence that capital markets are efficient in their use of information, given the assumption that the net impact of all tax factors, together with the interest elasticities of the demand and supply for loanable funds, is to produce a one for one incorporation of price expectations into nominal interest rates.

If the nominal interest rate can be decomposed into the sum of price expectations and the ex ante real rate, there still remains the problem of effecting this decomposition. Empirical evidence (see again, Pesando [1977]) suggests that the real interest rate is relatively constant and that the prime source of variation in the nominal rate is variation in the implicit price expectations. This result simplifies the problem and suggests - albeit with caution - that historical data on realized real returns on long-term Canada bonds may provide a good guide for the approximately constant ex ante real rate. The present author does not have access to the data necessary to draw precise inferences about this figure, although a casual inspection of interest rate and inflation data would suggest a figure in the 2 percent range. If a constant real interest rate is employed to extract the price expectations

implicit in nominal yields, the consequences of employing this assumption when the real interest rate is in fact variable are worthy of note.

Assume, for example, that the nominal interest rate is 10 percent and the government employs a real interest rate of 2 percent to extract the price forecasts when the real rate is actually 3 percent. The Federal Government thus provides inflation insurance to annuities escalated at 8 percent a year, when the implicit forecasts are for a rate of inflation of 7 percent. If the market forecast is correct, the government fund will experience a surplus, which is mirrored in additional costs cet. par. to the plan sponsor who is effectively able to purchase an indexed annuity at a real rate of only 2 percent rather than the true 3 percent. This point is clearest in the case where the sponsor purchases the annuity from a life company, although it applies to the case where the sponsor himself provides the annuity. To acquire inflation insurance, the life company would have to provide a basic annuity escalating at 8 percent a year. With a nominal rate of 10 percent, competition among life companies would result in their offering to sell these annuities at a real interest rate of 2 percent, again ignoring the costs to the life companies of engaging in this activity. Clearly, the cost to the plan sponsor would be higher than the case in which the basic annuity - prior to its indexation through inflation insurance - was escalated at 7 percent, which would be sold on the basis of a real interest rate of approximately 3 percent. If the error were in the opposite direction, the result would be symmetric. If the government employed a real rate of 2 percent when the true real rate

had dropped to one percent, the pre-insurance annuities would be escalated at a rate of 8 percent when a 9 percent rate is indicated by the market, again on the assumption that the nominal rate remained at 10 percent. The government fund would experience a deficit, while plan sponsors would be able to acquire indexed annuities at a cost which is less than the true economic one.

In short, if the government establishes a fixed real rate to be employed in its calculations and if the real rate rises, then the government fund would experience a surplus while plan sponsors would - in effect - pay too high a price for indexed annuities. The converse would occur if the real rate were to fall. So long as the real rate that is chosen is a good approximation to a long-run real return which has relatively small variation, these effects would net out over time. From the point of view of the long-run actuarial soundness of the inflation insurance fund, short-run variations in the real rate of interest would not present a problem. From the point of view of the plan sponsor, there exists the risk that a disproportionate number of plan members will retire (or become eligible for deferred annuities) when the real rate had risen above its long-run expected value. In this case, the plan sponsor would not be able to realize the cost saving associated with this rise in the real rate. Similarly, however, he would not incur the increase in costs which would otherwise occur when the real rate had fallen. In effect, if the long-run real interest rate is well approximated by the figure employed by the government, the uncertainty with respect to the cost of indexed annuities arising from variation in the real interest rate would be largely

removed. To conclude, errors arising from the variation in the ex ante real rate around its long-term value will not create problems regarding the actuarial soundness of the government fund. Further, the pegging of the real rate at its long-term value for purposes of implementing the insurance program will also eliminate uncertainty to plan sponsors stemming from the impact of changes in the ex ante real rate on the cost of acquiring indexed annuities.

Finally, all of the preceding discussion has focused on the inflation premium implicit in the nominal yields on fixed-income securities. Since the bond and equity markets are linked by arbitrage activities, there exists a comparable - but less apparent - inflation premium in the level of stock prices. For the providers of indexed annuities, be they life companies or plan sponsors, the choice will be between the reduction in risk associated with acquiring long-term bonds which bear the actual inflation premium built into the government program and the higher long-term real returns likely to be associated with a greater commitment to equities.

The Costs to the Firm

For sponsors of defined benefit plans, the move to indexed pensions would increase costs for two reasons: (1) sponsors would no longer benefit from the "windfall" gain created by purchasing a fixed-income annuity at a nominal interest rate which contains a substantial inflation premium and (2) sponsors, either directly or indirectly, would have to pay the premiums charged by the government for its insurance. The second effect on costs is not likely to be

large and, in any event, could be passed directly to the member by providing him with the option of either a fully indexed pension - in which he would purchase the inflation insurance - or a pension escalated by the expected rate of inflation at the time of his retirement.

The first effect on costs is likely to be more substantial. Plan sponsors may feel that the "windfall" gain associated with purchasing fixed-income annuities at a nominal interest rate is just - and perhaps only partial - compensation for the experienced deficiencies that they suffer in periods of high inflation. As noted, since the real return on pension plan portfolios is adversely affected by inflation, inflation may redistribute income away from plan sponsors to the benefit of other economic agents. As also noted, however, plan members are not likely to be beneficiaries of this income transfer. Since plan sponsors may incur higher than anticipated costs in an inflationary climate under present investment options, there is a legitimate argument that plan members be asked to share these costs. These costs may be shared with the plan members in a number of ways: (1) lower increases in current wages than would otherwise be the case; (2) higher contribution rates for employees; or (3) a reduction in unit benefits with unchanged contribution rates for employees. In short, the incidence of these costs need not fall only on the plan sponsor, nor is it likely to do so in the normal sequence of events.

The prime deterrant to indexation in the present institutional setting may well be the uncertainty as to its costs. If the government employs a constant real interest rate in implementing the insurance scheme, this rate

will approximate quite closely the rate at which life companies would ultimately be willing to sell indexed annuities. A plan sponsor could eliminate the uncertainty (as well as the "open-ended" commitment) by purchasing its indexed annuities from life companies. Alternatively, the plan sponsor could purchase only the inflation insurance and continue to incur the uncertainty associated with the possible departure of the real return on the supporting assets from this indicated rate. This uncertainty, in turn, would be minimized if the sponsor were to channel the supporting funds into long-term bonds which incorporate an inflation premium consistent with the (fixed) real rate employed in the government program. Note that if the sponsor places his funds in long-term bonds at a fixed nominal rate, his costs are insulated from both unanticipated inflation and unanticipated deflation, at least over the period during which the bonds cannot be called.

4. The Proposal and Alternative Schemes to Promote Indexation

The earlier discussion indicated that only the government sector - under present institutional arrangements - may be capable of assuming the inflation risk inherent in the existence of indexed pensions. The possible issuance of index bonds by the public sector has received considerable attention. The fundamental dilemma with this solution is that (1) if the Federal Government makes index bonds available on a sufficiently wide scale to effectively enable plan sponsors to provide indexed pensions, then the potential impact on Canadian financial markets might be sufficiently dramatic so as to make this option

unacceptable and (2) if the government were to make index bonds available on a more modest or gradual scale, so as to minimize the impact on the Canadian financial system, the capacity of plan sponsors to provide indexed benefits would only gradually be enhanced. Index bonds would, however, solve both the pre- and post-retirement indexation problems, and need not "force" private firms to issue their own index bonds in order to compete for funds with the Federal Government.

The inflation insurance proposal outlined above is more modest in its overall scope and is directed towards the two crucial limitations of private plans in an inflationary climate: (1) the erosion of the real value of deferred annuities which are offered terminating employees as a consequence of the lack of portability of defined benefit plans, and (2) the erosion of fixed-income pensions during the member's retirement years as a result of the lack of widespread contractual indexation. Indeed, the fundamental conclusion from the analysis of these limitations is that fixed-income annuities must be purchased at real rather than nominal interest rates if income is not be be systematically redistributed away from members of defined benefit plans. This result, which underlies the implementation of the inflation insurance proposal, could actually be exploited independent of the accompanying insurance scheme. Either the Federal Government, by virtue of its control of the tax environment in which private plans operate, or provincial governments by virtue of their regulatory powers could require that sponsors of defined benefit plans not be permitted to purchase annuities at interest rates which exceed (say) the average

real return on long-term Canada bonds, or around 2 percent. The plan member will have been promised a fixed-income annuity. By using the maximum rate permitted by law, the plan sponsor could determine the capital sum necessary to purchase the annuity. If current nominal rates contain an inflation premium, then this capital sum will exceed the amount necessary to purchase the fixed-income annuity at current market rates. This difference in costs would then be applied to escalating the fixed-income pension which - in effect - could be escalated at the then expected rate of inflation. The analysis of this scheme, including the incidence of its costs, directly parallels the earlier discussion of the inflation insurance proposal, and is extended in obvious fashion to the case where the plan sponsor himself provides the requisite annuities. For money purchase plans, such a requirement would not be necessary, since the capital sum accumulated on behalf of the employee will simply purchase a larger fixed-income annuity if nominal rates are high due to the presence of substantial inflation premiums. For parallelism, the members of defined benefit plans could be given the option of a higher fixed-income annuity rather than a lower but escalating one. Alternatively, to reflect the fact that high nominal rates indicate the expected decline in the real purchasing power of a fixed-income annuity, members of money purchase plans could be required to purchase escalating - rather than higher fixed-income - annuities if nominal interest rates embody a substantial inflation premium.

The major advantage of the inflation insurance proposal is that the potential impact on the Canadian financial system is likely to be minimal. Aside from creating an environment in which cet. par. fund managers might have

a greater preference for long-term bonds relative to other investments, the impact should be slight. Although this scheme would not eliminate the risk of experience deficiencies during inflationary periods arising with respect to active employees, the rapid expansion of final earnings plans indicates that sponsors are willing to assume this risk. This willingness presumably reflects the ability of plan sponsors to shift the incidence of these higher costs - at least in part - back to the employees.

A third option to the ones discussed at length in this report would be for the Federal Government to engage in the direct sale of indexed annuities. As noted in Pesando and Rea (1977), this approach would undoubtedly have a dramatic effect on the life insurance industry in particular, as well as on financial markets in general. Since this approach would not prove superior to the inflation insurance proposal in its effectiveness, the latter - with its much more modest implications for the Canadian financial system - is obviously preferred.

5. A Final Overview

Since economic forecasters - as well as the bond market - agree that infaltion rates in Canada are likely to remain high by historical standards for the foreseeable future, the capacity of private plans to provide indexed benefits will in all likelihood receive increased attention. Of the options available to the Federal Government in this area, the underwriting of

inflation risk through the use of insurance principles would appear to be the most attractive. Although a variety of schemes could undoubtedly be devised around this inflation insurance principle, the operation of one illustrative scheme (only) is outlined in the present chapter. Although the full details of any such scheme await the acceptance of the inflation insurance principle, the preliminary discussion in this chapter suggests that practical problems likely to arise in its implementation could probably be overcome without great effort.

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