

**INSURANCE OF INDEX-LINKED MORTGAGES UNDER
THE NATIONAL HOUSING ACT: A DISCUSSION PAPER**



**Canada Mortgage and Housing Corporation
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I. Background

The theory of real-term borrowing emerged in the academic literature in the mid-1970s, when inflation was accelerating in several western economies, including Canada. In June 1982, the federal government tabled a consultation paper "Inflation and the Taxation of Personal Investment Income" proposing, amongst other ideas, some important considerations governing the design of indexed-term loans for housing finance purposes. These considerations were related to the safety and acceptability of indexed mortgages, including the period of amortization, the conditions for mortgage renewal, the extent to which repayments are indexed, the ratio of loan to lending value, and the initial ratio of gross debt service to income.

There was broadly based support for the proposed indexed-term housing loans. For example, a report of 1982 by the former Economic Council of Canada recommended the introduction

of indexed mortgages for sale to pension funds and to registered retirement savings plans, and the offering of direct insurance on such mortgages on a temporary basis by CMHC. The Council further recommended the development of a secondary market for these mortgages. In 1985, the study team report on housing to the Ministerial Task Force on Program Review recommended that National Housing Act (NHA) insurance be used to facilitate the appearance of indexed-term housing loans.

The index-linked mortgage (ILM) was the financing mechanism for the former federally-assisted cooperative housing. In 1990, CMHC reviewed the experience of ILM, as part of the Cooperative Housing Program. The report has reaffirmed the financial viability of ILM.

In December 1991, the federal government introduced \$700 million 30-year real-return bonds. The coupon of these bonds, payable semi-annually, carries a 4.25-per-cent real rate of interest. Their par value will be adjusted, with a lag of three months, according to the actual inflation during the period between the latest and the previous coupon dates. Both the coupon and the increase in the par value will be considered as earned interest income and subject to taxation as they are earned. In September 1992, an additional \$500 million of real-return bonds of the same class were offered. These bonds were priced at 92.15 per cent to provide a real yield of about 4.75 per cent to maturity.

II. Conceptual Framework

Nominal Borrowing

The equal payment mortgage (EPM) is an instrument that fixes the nominal rate of interest and, therefore, the monthly blended interest payments and principal repayments at a specific level over the term of the loan. The nominal rate of interest is the sum of the real interest rate, the expected inflation and the inflation-risk premium. At subsequent loan renewals, the interest rates and the mortgage payments may increase, decrease or stay the same, depending on the prevailing market conditions.

Real-Term Borrowing

The index-linked mortgage is an instrument based on five characteristics. First, the interest liability is set on a real, after-inflation basis. Second, the initial monthly loan payments reflect the real rate of interest or, as a safeguard, a rate somewhere between the real rate of interest and the corresponding nominal rate of interest. Third, the monthly payments are adjusted fully or, as a safeguard, partially in accordance with the actual inflation. Fourth, the outstanding loan balance is adjusted fully in accordance with the actual inflation to preserve the purchasing power of money. Fifth, any shortfall between the monthly payments and the sum of the interest liability and the inflation adjustments of the unamortized principal is added to the principal outstanding.

Borrower Benefits

By preserving the purchasing power of money on the basis of full inflation adjustment, ILM removes the need to incorporate any allowance for the risk of inflation. As a result, it potentially reduces the effective borrowing costs, thus making housing finance more affordable.

With EPM financing, the equal payments as a proportion of income declines as the borrower's income increases over time. Suppose the ratio of mortgage payments to income at the

initiation of the loan is 30 per cent. If income increases 4 per cent a year, the debt-service ratio would decrease to 25 per cent in 5 years and 20 per cent in 10 years. ILM recognizes income growth. Through complete or partial indexation of mortgage payments to the actual inflation, these payments are initially lower. This evens out the burden of mortgage payments relative to income during the life of the loan. Consequently, ILM tends to increase the number of borrowers who can potentially qualify for housing finance, thus improving homeownership access.

Because the payment changes under ILM are driven by the actual inflation and because income varies with inflation, the ratio of mortgage payments to income under ILM is more stable than the payment-to-income ratio under EPM, which varies with expected inflation and the inflation-risk premium. This enhances the security of homeownership.

Borrower Tradeoffs

The benefits of ILM to the borrower come with several tradeoffs. There will be little, if any, growth from the initial equity position in the home, as represented by the downpayment, for a period of time, unless the value of the home increases significantly faster than inflation. Therefore, ILM offers less potential in using home equity to facilitate housing tradeup. Another

tradeoff is potential short-term cash-flow difficulties, as income growth and inflation may not always move in lock-steps. Unlike the built-in decline in the ratio of mortgage payments to income under EPM, which provides the borrower with some buffer against income or expenditure shocks, the relatively constant ratio of mortgage payments to income under ILM does not.

Lender Benefits

The benefits of ILM to the borrower represent no cost to the lender. Because the unamortized loan is fully indexed to inflation, ILM generates a known and constant real rate of return to the lender. Furthermore, the peril of an inadequate inflation-risk premium disappears. ILM should appeal particularly to those lenders needing an instrument to match liabilities denominated in real terms, such as pension funds with full or partial inflation protection.

Critical Success Factors

On the supply side, the lender must view ILM as a long-term instrument and accept the fact that investing in it generates an opportunity cost of not capitalizing on short-term rates of return that may be higher in periods when nominal interest rates are high relative to inflation. The lender must also accept the fact that loan

amortization would be longer if inflation goes up and shorter if it comes down. Lender acceptance further includes the rising outstanding loan balance (negative amortization) in the initial years of the mortgage if inflation exceeds, as a general rule, three per cent.

On the demand side, ILM may not be appropriate for every borrower or situation. The actual savings in ILM borrowing cost, relative to EPM, are not totally certain, as the inflation-risk premium is not a constant in an economic cycle. The viability of ILM requires the borrower's income increasing at or near the rate of inflation on a fairly consistent basis, so that there will be no significant erosion of the borrower's ability to cope with the inflation-adjusted mortgage payments. ILM also requires the house value appreciating at or near the rate of inflation on a fairly consistent basis to offset the outstanding loan balance rising above the prevailing market value of the mortgaged home if initial negative amortization occurs.

III. Design Considerations

Overview

The design of ILM is governed by three major parameters, reflecting different tradeoffs between access and

risk: the rate of interest for the purpose of determining the initial mortgage payments, which ranges from the real rate to the corresponding nominal rate; the extent to which the mortgage payments are indexed to the actual inflation, which ranges from zero to 100 per cent; and the rate of interest for loan qualification purposes, which ranges from the real rate to the corresponding nominal rate.

There are four other risk parameters: the maximum loan-to-value ratio, the maximum gross-debt-service ratio, the planned amortization period and the maximum actual amortization period.

Determination of Initial Payments

Consider, for example, a mortgage of \$100,000 over 25 years. The difference in the initial payments between contracting at a 9-per-cent nominal rate of interest, amounting to \$827.98 a month, and at a 4.5-per-cent real rate of interest, amounting to \$553.47 a month, is \$274.51. This payment difference is a result of borrowing in an environment with inflation, and is sometimes called the tilt effect of inflation.

Because the interest liability under ILM is determined by the real rate of interest, basing the initial payments on a

rate of interest higher than the real rate translates, in effect, into intentional over-payments, which create a safeguard against the default risk. In other words, the inflation-induced payment tilt of \$274.51 in the above example need not

qualify under ILM relative to EPM as the minimum required borrower income goes from \$40,500 to \$35,000.

Table One: Impact of Tilt Removal

Degree of Tilt Removal	Initial Monthly Payments	Minimum Annual Income*
100 %	\$ 553.47	\$ 29,500
75	622.10	32,300
50	690.73	35,000
25	759.35	37,800
0	827.98	40,500

* The additional assumptions are loan-to-value ratio of 90 % and annual property tax of 2 % of house value

be completely removed. Table One illustrates the effects of various degrees of tilt removal on the initial loan payments and on the minimum income for the purpose of mortgage qualification at 30 per cent of income:

For example a removal of one-half of the payment tilt cuts the initial monthly payments by nearly 17 per cent, from \$827.98 to \$690.73. Therefore more borrowers are able to

Adjustment of Payments to Inflation

Since any incomplete removal of the payment tilt generates intentional over-payments, this creates the potential for the mortgage payments to rise at less than the actual inflation over the life of the loan, although full indexation still applies to the unamortized principal. Partial payment indexation addresses the concern that borrower income may not always increase in tandem with

inflation at all times.

Design Tradeoff

Table One suggests a key design tradeoff. The number of borrowers eligible for ILM increases as more payment tilt is taken away. However, as more and more payment tilt is removed, the extent to which the monthly payments must rise with inflation also increases. Conversely, the number of qualified borrowers falls as less and less payment tilt is removed, but the extent to which the monthly payments must rise with inflation also decreases. It is clear that a responsible design of ILM ought to strike a balance between accessibility and security.

Qualifying Interest Rate

As Table One shows, loan qualification under ILM on the basis of the 4.5-per-cent real rate of interest means that a borrower who has an annual income of \$29,500 gets the \$100,000 loan, representing about 3.4 times the borrower's income. Loan qualification at the real rate does not appear to be prudent.

At the other extreme, loan qualification based on the corresponding 9-per-cent nominal rate means that a borrower who has an annual income of \$40,500 passes the test. Under this

approach, the effect of real-term borrowing is a reduction in the initial gross-debt-service ratio to 22 per cent from the 30 per cent which would otherwise prevail under nominal borrowing.

A feasible interest rate for ILM qualification purposes lies somewhere between the real rate and the corresponding nominal rate.

IV. Design Alternatives

Public Policy Context

The federal policy regime in the area of market housing is defined by the criteria of affordability, accessibility and security. Where NHA insurance is a required policy instrument, the insurance must be consistent with the principle of general cross-subsidization within a self-financing Mortgage Insurance Fund (MIF). As noted in section II, ILM-financed housing is more affordable because the borrowing costs are potentially lower. It is more accessible since the minimum income needed to qualify for the financing is reduced. Further, security is enhanced by the more stable proportion of income directed to service the mortgage.

ILM has potential applicability to finance homeownership, rental and

cooperative housing. However, the public policy merits of each of these applications vary because the enhancements in affordability, accessibility and security of ILM, when adjusted in accordance with insurance risks, are not constant.

Homeownership Application

Under this application, the borrower's decision boils down to a choice between EPM's payment for the expected inflation and ILM's payment for the actual inflation. There are numerous broad configurations of illustrative insurance parameters, some of which are presented in Table Two:

Table Two: Pricing Terms and Conditions

House Value:	\$ 150,000		Amortization:	25 years		
Nominal Rate:	9.0 %		Inflation Premium:	2.5 %		
Real Rate:	4.5 %		Annual Property Tax:	2.0 %		
	<u>Downpayment</u>		<u>Qualifying Income</u>		<u>Real-Term Parameters</u>	
	<u>LTV Ratio</u>	<u>% of Income</u>	<u>GDS Ratio</u>	<u>Minimum Level</u>	<u>Tilt Removal</u>	<u>Index Rate</u>
			<u>1.25 % Premium</u>			
EPM	80 %	60 %	30 %	\$ 49,700	0 %	0 %
ILM	75 %	73 %	24 %	\$ 51,400	50 %	75 %
			<u>2.00 % Premium</u>			
EPM	85 %	43 %	30 %	\$ 52,200	0 %	0 %
ILM	80 %	63 %	27 %	\$ 47,900	50 %	75 %
			<u>2.50 % Premium</u>			
EPM	90 %	27 %	30 %	\$ 54,700	0 %	0 %
ILM	85 %	54 %	30 %	\$ 41,700	75 %	100 %

The ILM calculations in Table Two are consistent with loan qualification at the real rate of interest plus the amount of the remaining tilt. In addition, the actual amortization, which is a function of the actual inflation, is subject to a maximum of 35 years although the initial mortgage payments are calculated over a 25-year planned amortization horizon. In other words, the monthly instalments are driven by the prescribed inflation adjustment or by the 35-year amortization ceiling, whichever is larger. The EPM insurance terms and conditions are presented for comparison purposes.

The three illustrative permutations of ILM parameters are commercially viable, but they tend to appeal to different types of borrowers. The 2.5-per-cent-premium model is for those who want small downpayment (15 per cent), high debt-service ratio (30 per cent), large tilt removal (75 per cent) and can cope with future mortgage payments rising at the rate of inflation (100 per cent). However, those who want a lower rate of inflation indexation (75 per cent) and can cope with the higher initial payments due to less tilt removal (50 per cent), larger downpayment (25 per cent) and lower debt-service ratio (24 per cent), the 1.25-per-cent premium model is more suitable. The 2-per-cent-premium model is an in-between configuration.

At a given level of insurance

premium, access to housing finance through ILM relative to EPM generally involves a tradeoff between downpayment and income. Consider a premium of 2.5 per cent. Relative to EPM, the minimum downpayment under ILM rises by five percentage points from 10 per cent to 15 per cent, but the minimum income for loan qualification purposes falls by \$13,000 from \$54,700 to \$41,700. Therefore, ILM improves homeownership access for those with lower income but higher saving propensity. On the other hand, EPM achieves the same end with opposite means.

Rental Application

The working model is premised on rental EPM underwriting practices driving ILM loan qualification. Notwithstanding the notion of a real rate of interest, rental viability is assessed on the basis of the nominal rate of interest. Borrowers who qualify for EPM are able to choose between staying with EPM and paying a premium surcharge of, say, one per cent for the alternative ILM. This means that, under the working model, the premium for existing rental ILMs with a loan-to-value ratio of 85 per cent is three per cent, relative to the two-per-cent under EPM, while the premium for 75-per-cent ILMs is 2.5 per cent as compared with the 1.5-per-cent under EPM. With ILM, the borrower is provided with the potential of lower financing costs and improved cash flow in the early years of the investment.

The extent to which these two financial benefits of ILM relative to EPM is capitalized is directly proportional to the efficiency in the property investment market. Such capitalization adds value to the rental investment and, as a result, reduces the effective loan-to-value ratio. This relationship is sensitive to the

Against a nominal interest rate of 9 per cent, the removal of an inflation-risk premium of 2.5 per cent through ILM could effectively reduce the loan-to-value ratio by up to 20 percentage points from 85 per cent to 65 per cent. Relative to EPM, the 50-per-cent tilt removal under ILM lowers the initial

Table Three: Effective Loan-to-Value Ratio

Book LTV Ratio:	85.0 %	Tilt Removal:	50 %
Real Rate:	4.5 %	Indexation:	75 %
Amortization:	25 years	Discount:	Nominal less 2 %

Nominal Rate	Inflation-Risk Premium				
	1.0 %	1.5 %	2.0 %	2.5 %	3.0 %
8 %	73.5 %	70.4 %	67.6 %	65.2 %	63.2 %
9 %	73.1 %	70.1 %	67.5 %	65.1 %	63.2 %
10 %	72.6 %	69.8 %	67.3 %	65.1 %	63.2 %
11 %	72.2 %	69.6 %	67.2 %	65.1 %	63.2 %
12 %	71.9 %	69.3 %	67.0 %	65.1 %	63.2 %

inflation-risk premium, nominal interest rate, tilt removal and inflation indexation. Table Three illustrates the impact of ILM on the effective loan-to-ratio:

debt-service burden by about 17 per cent. However, due to the 75-per-cent indexation of mortgage payments to inflation, the initial cash-flow advantage of ILM diminishes as the loan amortizes. In the latter years of the

mortgage, the debt-service burden is higher with ILM than EPM. This means that the risk of insuring ILM rises over time. Thus, the front-end accrual of financial benefit to the borrower against the rear-end accrual of insurance risk to the insurer does not represent a balanced public-policy equation.

Cooperative Application

The object is to provide customized ILM financing for equity cooperatives and not-for-profit cooperatives. With respect to equity cooperatives, the working model is based on insurance parameters that are similar to those for homeownership housing. Equity cooperatives are a niche housing form, aimed at occupants with special housing needs and the capital to make the investment. Most equity cooperatives at present are developed as affordable retirement housing.

Relative to the ILM design in connection with the former federal Cooperative Housing Program, the design for unassisted, not-for-profit cooperatives reflects the withdrawal of the one-per-cent sector support, the subsidies to eliminate rent-cost imbalances with a phase-out after 15 years, the option to use up to 50 per cent of the dwellings to serve low-income households under the Rent Supplement Program and the assumption of contingent liability by the Minister arising from the actuarially-

deficient premium.

The working model retains the six-per-cent effective risk premium and the 100-per-cent financing of project cost under the former ILM design as the starting point. The not-for-profit cooperative premium is higher than the rental premium because of no equity contribution, financing on the basis of cost rather than lending value and absence of personal covenant.

As in rental ILMs, the maximum tilt removal is 50 per cent and the minimum indexation is 75 per cent in unassisted, not-for-profit cooperative ILMs. However, in contrast with rental ILMs, the demonstration of long-term viability, including no negative cash flow, is based on ILM parameters, not the more conservative EPM numbers. This is to recognize the risk differential between for-profit rental and non-for-profit cooperative ILMs. Unlike the ILM design associated with the former federal Cooperative Housing Program, a stabilization fund is not a requirement.

V. Consultation Process

This paper is intended to further the discussion of NHA insurance of ILM with the stakeholders on the basis of the next level of design details, as well as the remaining issues such as securitization. It is an important vehicle

to obtain further inputs from those who have expressed support of this product, including the Canadian Bankers' Association, Canadian Home Builders' Association and Co-operative Housing Federation, before the matter is brought forward for decision-making purposes.