



## RBC CM CANADIAN BOND MARKET INDEX

### *CONSTRUCTION AND CALCULATION DETAILS*

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#### Fixed Income Analytics

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**November 30, 2001**

The RBC CM Canadian Bond Market Index (the “Index”) is a fully disclosed benchmark that accurately represents the total return on the Canadian bond market. The Index is a market-value weighted average of total bond returns, including coupon income and capital gains or losses. Sub-indices reflect maturity and credit sector performance. Other indices include the RBC CM Canadian High Yield Bond Index and the RBC CM Money Market Index, both launched in May 1998 and described in separate documents.

Key advantages of the RBC CM Canadian Bond Market Index include:

#### **ACCESSIBILITY**

- Daily Index returns are calculated using RBC Capital Markets closing 5:00 p.m. bid prices.
- Daily Index data are available in the *National Post* and the *Globe and Mail*, on Bloomberg, Reuters, and Telerate, [www.rbccm.com](http://www.rbccm.com), and via email.
- Historical data is available on Bloomberg and via email.
- Daily Index data and pricing on individual securities are available through CMS Canadian BondEdge, the Canadian version of the leading fixed income portfolio risk management software used by over 500 institutional investment firms in the U.S. The partnership between RBC Capital Markets and BondEdge offers a sophisticated, flexible, and user-friendly portfolio management system that combines relevant analytics with industry-standard Canadian data and valuations.
- Option-adjusted yield and duration, key-rate duration, convexity, and other key statistics are available.
- Intra-daily Government of Canada Index returns are available on Reuters.

#### **ACCURACY**

- Changes in Index constituents and Index characteristics are published before and after each month-end rebalancing in detailed reports that include useful bond portfolio analysis.
- Stringent, transparent, and objective selection criteria do not depend on valuation models.
- Since the inception of the Index, adjustments for bond strip, reconstitution and sinking fund activity have been made consistently.

#### **ANALYTICS AND DERIVATIVES**

- Customized indices are available.
- RBC Capital Markets trades total return swaps on the RBC CM Canadian Bond Market Index and sub-indices which, combined with asset swaps or other strategies, can facilitate tracking or outperformance of the Index by institutional investors. Index-linked structured notes are also available.

Bloomberg: RBCI  
Reuters: RBCDSINDEX  
Telerate: 40973-40977  
[www.rbccm.com](http://www.rbccm.com)

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## INDEX DESCRIPTION

RBC Capital Markets is one of the leading investment dealers in all facets of Canadian bond and money markets servicing Canadian and overseas clients. The RBC CM Canadian Bond Market Index (the “Index”, formerly the DS BARRA Canadian Bond Market Index) was launched in November 1993. Historical data is available beginning December 1987. Appendix I provides charts of historical Index returns.

### **FULLY DISCLOSED BENCHMARK**

The Index is a fully disclosed benchmark which includes over 900 securities with maturities of greater than one year and accurately represents the total return on the Canadian bond market. The way in which the RBC CM Canadian Bond Market Index reflects the returns on the Canadian bond market is similar to the way in which the TSE 300 represents the performance of the Canadian stock market. Sub-indices reflect maturity and credit sector performance. The decision guidelines and the composition of the Index and sub-indices were established in conjunction with a cross-section of established Canadian pension funds and investment counsellors. The rules are consistent with major U.S. and international bond indices and generally reflect the same performance presentation standards followed by portfolio managers.

The full and open disclosure of the components of the RBC CM indices reflects our intention to assist in the performance evaluation efforts of Canadian bond portfolio managers. Customized Index statistics and returns are available from RBC Capital Markets. A daily data feed of all individual bond prices and returns is available to enable clients to replicate our Index calculations or to create their own customized indices.

The Index is a market-value weighted average of total bond returns, including price and coupon return, weighted daily using the net amount of bonds outstanding adjusted for strip and reconstitution activity. Index returns use RBC Capital Markets daily 5:00 p.m. closing bid prices. Index Calculations based off of RBC Capital Markets daily 4:00 p.m. bid prices are also available.

We endeavour to make the Index construction methodology as clear and transparent as possible and the details are laid out in this document. The Index inclusion criteria have evolved to reflect innovation in the Canadian bond market. The Index was expanded to include Medium Term Notes (MTNs) on June 30, 1996, Canadian Financial Institution fixed/floating issues on September 30, 1996, municipal bonds on May 31, 1997 and large broadly distributed private placements on February 28, 1998. On June 30, 1997, the methodology used to calculate total returns changed to reflect reinvestment of cash flows on a daily basis at the Index return rather than at the T-bill rate through each month end. In April 1998, rules concerning the use of ratings by U.S. agencies were amended. In May 1998, rules governing the allocation of bonds to government or corporate sub-sectors were developed to clarify the treatment of newly privatized or quasi-government issuers.

## ***INDICES REBALANCED MONTHLY***

The Indices are rebalanced monthly and index constituents are held constant throughout each month. A *Preliminary Index Rebalancing Report*, issued a few days before each month end, informs investors of changes in Index constituents, sector weights, and other Index statistical characteristics. Our *Final Index Rebalancing Report* includes additional analysis of Index performance and forecasts returns for various interest rate scenarios. Both reports are available by email.

The Index constituent bonds are determined on the last calendar day of each month. The bonds that satisfy the Index criteria, including new issues that settle on or before that month end, constitute the Index portfolio for the following month. The Index portfolio is held constant until the following month-end date. For example, upon rebalancing on December 31, 1997, 778 bonds were included in the Index. This portfolio was held constant through the month of January until the Index was rebalanced once again on January 31, 1998. A complete list of Index bonds is published twice yearly and is available at any time on request.

## ***INDEX CHARACTERISTICS***

Index price returns, total returns, modified duration, and option-adjusted durations are published daily. All index characteristics, such as average option-adjusted yield-to-maturity, modified duration, option-adjusted duration, and option-adjusted convexity, are computed using the CMS Canadian BondEdge analytics system and are published monthly (prior to September 30, 1999 these statistics were calculated using BARRA's Canadian Fixed Income Service). These characteristics and customized breakdowns are available at any time on request.

The characteristics, published each month end, are computed as of the month-end Index rebalancing date for the newly rebalanced Index portfolio. If the month ends on a weekend, bond prices used are for the last business day of the month and accrued interest is calculated as of the last calendar day. All accrued interest calculations are based on trade date accounting rather than settlement date.

Appendix II shows historical Index characteristics. Of note, is the increase in the corporate sector weight from approximately 8% in 1989 to 19% in August 1999. This increase has come mainly at the expense of the Government of Canada sector weight. We expect the corporate sector weight to continue to grow.

## DATA AVAILABILITY

All historical returns and characteristics data are available in electronic format on request. Monthly data are available starting December 31, 1987 and daily data starting December 31, 1994. Detailed Index reports are available before and after each month end by email, fax and post.

### DAILY DATA

Daily Index levels, price returns and total returns are available for the RBC CM Canadian Bond Market Index and sub-indices daily in the *National Post* and the *Globe and Mail*, and on electronic news services by 6:00 p.m. each day. Modified and option-adjusted durations are available electronically at 6:00 a.m. the following day. Prices on select bonds in the Index are available in the newspapers daily and a complete list of Index bonds and prices is published weekly. Electronic access is as follows:

- **Bloomberg** – *RBCI*
- **Reuters** – *RBCDSINDEX* (also includes intra-daily returns on the RBC CM Canadas sub-index calculated every five minutes)
- **Telerate** – *40973 - 40977*
- Daily historical Index level and modified duration data commencing December 31, 1994 are available on Bloomberg. For the RBC CM Canadian Bond Market Index level, type: *LEVLDSMO <Index> HP <GO>*. The HMS function can be used to chart several sub-indices simultaneously.

### MONTHLY DATA

We publish daily and month-to-date returns for the close of the last business day of each month after the close of trading. For months ending on a weekend, the *monthly* return reflects accrued interest to the last calendar day of the month. Therefore, on those month ends, the daily and monthly closing Index levels differ. The monthly returns are in the *Final Index Rebalancing Report* and on Bloomberg in the *monthly* series for each sub-index.

- To find the calendar month-end level for the Index on Bloomberg, type: *LEVLDSMO <Index> HP M <Go>*
- To find the calendar month-end modified duration for the Index type: *MDURDSMO <Index> HP M <Go>*

Monthly average yield and sub-index market values are available on Bloomberg. Type the following for a complete list of tickers:

- Average Yield – *AVYD <Index> <Go>*
- Market value of Indices – *MVAL <Index> <Go>*

## *TYPE OF BOND*

## BOND SELECTION CRITERIA

- Canadian domestic or global public and private bonds and MTNs **with broad institutional distribution** are included.
- Bonds with embedded options, sinking funds, amortization schedules, and step-up coupons are included.
- Non pre-payable asset-backed securities are included.
- Private issues must be placed at issue with at least 10 institutional clients in order to be included. After initial distribution, we maintain a watch list of narrowly distributed bonds and allow inclusion at a later date if they became broadly distributed and trade in the secondary market. Any bonds included are announced in the *Preliminary* and *Final Rebalancing Reports*.
- Large public issues that are distributed only to retail investors, not institutional investors, are excluded from the Index. This rule typically applies to Federal Agency issues distributed only to retail investors. We use this rule since the Index aims to reflect the universe of bonds available to institutional money managers.
- Eurobonds, Yankees, Mortgage Backed Securities, real return bonds, strip bonds, and convertible bonds are excluded.
- See below for rules added in May 1998 for classification of bonds in the government and corporate sector.

## *AMOUNTS OUTSTANDING*

### *Adjustments of Amounts Outstanding*

- Adjustment of amounts outstanding for strip and reconstitution activity occurs at each month end, reflecting CDS data on strip and reconstitution activity before the previous month end.
- No adjustment of the amount outstanding is made for bonds held by the Bank of Canada.
- Mandatory sinking fund payments are reflected in the Index weights for calculating returns on the day they occur, but if the sinking fund causes the net amount outstanding to fall below \$50 million, the bond is not removed from the Index until the following month end.
- Optional sinking fund adjustments are made at month end.
- Re-openings of existing issues are reflected in the Index weights at month end.

### *Minimum Amount Outstanding*

We believe the Index should reflect liquid bonds and that inclusion criteria should be objective and known to investors in advance. In order to exclude very illiquid issues without relying on subjective judgement, bonds must meet the following minimum amount outstanding criteria (net of strip, reconstitution, and sinking fund activity):

*Public Issues*

- **Canadas and Federal Agencies**  $\geq$  \$100 million. Note that this cut-off implies exclusion of many small issues by Federal Agencies such as FBDB, EDC, FCC, and Canadian Wheat Board, many of which tend to be distributed primarily to retail investors.
- **Provincials**  $\geq$  \$50 million.
- **Corporates**  $\geq$  \$50 million.
- **Canadian Financial Institution Fixed/Floating Issues**  $\geq$  \$50 million, included as of September 30, 1996.
- **MTNs**  $\geq$  \$50 million, included as of June 30, 1996.
- **Municipals**  $\geq$  \$50 million, included as of May 31, 1997. Note that this excludes many municipal bonds that are issued in small size or as serial issues with each tranche less than \$50 million.

Note that Canadian municipal bonds have the same tax treatment as other bonds – i.e., they are not tax exempt. Municipal bonds refer to bonds issued by city and regional governments. Bonds issued by most “Municipal Finance Authorities” are fully guaranteed by their province so we include these bonds in the Provincial sector rather than in the Municipal sector. The exceptions to this are bonds issued by the B.C. Municipal Finance Authority which are not provincially guaranteed. These are classified as Municipal bonds and were added to the Index on May 31, 1997 along with all other Municipal issues.

*Private Issues*

- Privates in all sectors  $\geq$  \$100 million, if distributed to at least 10 institutional investors at issue, included as of February 28, 1998. These large private issues tend to trade on the secondary market with liquidity comparable to public issues of similar or smaller size.

**INVESTMENT GRADE***Corporate and Municipal Bonds*

- For corporate and municipal bonds, if rated by a Canadian agency, the lower of the DBRS and S&P rating is used and must be BBBL or higher. Bonds rated below BBBL are included in the **RBC CM Canadian High Yield Bond Index**.
- The minimum of the DBRS and S&P rating is used to classify corporate bonds into ratings sub-indices.
- If not rated by a Canadian agency, but rated by Moody’s, Baa3 by Moody’s is used to determine inclusion. Note that the U.S. ratings only apply if a bond is **not** rated by S&P or DBRS. This rule was added in April, 1998.

*Provincial Bonds*

- The minimum rating criterion does not apply to provinces. Currently all provincial bonds are investment grade.

## *COUPON*

Fixed coupon, with the following exceptions:

- Callable bonds with coupons that “step up” on the call date are included.
- Fixed/floaters issued by Canadian Financial Institutions are included (as of September 30, 1996). These bonds are expected to mature on their call date and are not expected to remain outstanding at the floating rate. Other floating rate notes are excluded.
- Bonds with monthly, quarterly, semi-annual and annual coupon frequency are included. Most Canadian bonds have semi-annual coupon frequency. Some MTNs are monthly pay or have coupon dates that do not fall on the maturity date.
- Note that a large number of Canadian bonds have maturities of March 1 or 15, June 1, September 1 or 15, or December 1. On these days, the duration of the Index tends to extend by approximately 0.05 to 0.1 years as the coupon is paid and reinvested in bonds.

## *TIME TO MATURITY*

- Bonds must have maturities greater than one year plus one day on the month-end rebalancing date. The extra day is used since a large number of Canadian bonds mature on the first day of the month.
- Time to maturity is based on a calendar year. For example, for the Index constituents as of January 31, 1999, all bonds maturing February 2, 2000 and thereafter are included in the Index. This is the same for leap year periods.
- For purposes of inclusion criteria and sub-index categorization, **callable, extendible and retractable bonds** are treated as having a maturity of their **long** date. The maturity of **Financial Institution fixed/floaters** is considered to be the call date before the issue starts to pay floating. We use this rule so that bonds do not bounce in and out of the Index or between sub-indices depending on whether they are trading to the short or long date. This rule ensures that investors need not know our option pricing model in order to know the composition of the sub-indices.

This rule implies that the Long Index can contain some bonds with very short option-adjusted duration. Investors tracking the long sub-index should pay particular attention to the optionable bonds included in that sub-index and to the difference between modified and option-adjusted duration. The rule also implies that there can be callable bonds in the Index that are trading to their short date that is less than one year away.

## *BONDS ENTERING THE INDEX*

A new issue that satisfies the Index criteria will enter the Index at the end of the month in which the issue **settles**. Reopened issues are also eligible for inclusion in the Index as of the **settlement** date, provided that the **total** issuance (net of strip) satisfies the Index criteria.

***BONDS EXITING THE  
INDEX AND MOVING  
BETWEEN SUB-INDICES***

Once a bond enters the Index, it can only exit at a month-end rebalancing date. Called bonds are removed from the Index at the end of the month during which the call is announced. This is usually a few weeks before the call date. If a mandatory or optional sinking fund payment results in an adjusted amount outstanding below the inclusion criteria, the bond is removed from the Index at month end.

If a bond's maturity drops to less than one year plus one day in the middle of the month, the bond remains in the Index portfolio until month end. If its maturity falls below five years plus one day during the middle of the month, it remains in the Intermediate Index until month end at which time it enters the Short Index.

If a bond is downgraded to below investment grade by either Canadian rating agency in the course of the month, it exits the Index only at the following month end. For example, if a BBB bond is in the Index portfolio as of January 31, 1999, and is downgraded to BB (by either rating agency) on the 10th of February, it continues to be part of the Index until the month-end, February 28<sup>th</sup>, at which point it exits the Index. The monthly return of this bond is computed based on the market price (and accrual amount) as of January 31, 1999 (when it was rated BBB) and the market price (and accrual amount) as of February 28, 1999 (when it is rated BB).

A similar methodology is used for the Corporate sub-indices. For example, a bond rated AA by DBRS and AA by S&P as of January 31, 1999 is included in the Corporate AA Index as of that date. If DBRS or S&P downgrades the rating from AA to A on February 10, 1999, this bond continues to be part of the Corporate AA Index until February 28, 1999, at which point it enters the Corporate A Index.

***SUB-INDEX  
CLASSIFICATION***

Recent new issuers in the Canadian bond market have generated some controversy over the classification of their bonds in the Canada, Provincial, or Corporate sub-indices. New structures are often issued by private entities with revenues linked to, but not necessarily guaranteed by, a government entity. We believe it is important for investors to be able to refer to our written rules rather than relying on our judgement on individual issues to determine whether and how a bond enters the RBC CM Canadian Bond Market Index.

As of May 11, 1998, we developed new rules to determine whether a bond is classified as a government or a corporate. The Office of the Superintendent of Financial Institutions (OSFI) regulates and supervises federally regulated financial institutions which include banks, federally incorporated or registered insurance, trust, and loan companies, cooperative credit associations, and fraternal benefit societies. OSFI is also responsible for monitoring federally regulated pension plans. OSFI sets out Minimum Continuing Capital and Surplus Requirements

(MCCSR) for life insurance companies and fraternal benefit societies. These factors provide a reasonable external opinion on the appropriate treatment of bonds. Although other types of investment managers are not governed by the MCCSR factor, we prefer to have this reasonable external judgement to rely on rather than imposing our own subjective assessment when bonds fall into a grey area based on other criteria. The MCCSR factor is generally known when a new issue is being marketed. There is no external source driving the classification of the bond into Corporate sub-sectors (Financial, Industrial, or Utility), so we disclose our decision at each month end.

The following table shows the definition of MCCSR factors based on the type of bond along with the corresponding RBC CM Canadian Bond Market Index classifications. Please note that for Index purposes if a bond has a split rating by CBRS and S&P, the minimum of the two ratings is used to classify the bond into a rating sub-index.

Factor	Bonds	RBC DS Bond Market Index Sector
0%	Canadian and all provincial and territorial government bonds and bonds of OECD central governments and claims against OECD central banks	Canada or Provincial (The RBC CM Canadian Bond Market Index does not currently include bonds issued by OECD central governments or claims against OECD central banks).
	<b>Bonds Rated:</b>	
0.25%	AAA,A++ or equivalent	AAA Corporate or Municipal
0.5%	AA, A+ or equivalent	AA Corporate or Municipal
1%	A, A or equivalent	A Corporate or Municipal
2%	BBB, B++ or equivalent	BBB Corporate or Municipal
4%	BB, B+ or equivalent	RBC DS Canadian High Yield Bond Index BB Corp or Muni
8%	B, C or equivalent	RBC DS Canadian High Yield Bond Index B or C Corp or Muni
16%	lower than B, C or equivalent	RBC DS Canadian High Yield Bond Index <C Corp or Muni

Bonds in the Index as of August 31, 1999 for which the MCCSR factors were important are listed below along with their sectors. Currently bonds issued in Canadian dollars either domestically or globally by IADB and other similar agencies have non-zero MCCSR classifications and are, therefore, included in our Corporate sector. Note that the classification of bonds in the Scotia Capital Markets Index is often different. For example, the Toronto Hospital bond is in their provincial sector.

Issuer	Issue Date	Coupon (%)	Maturity	Amount Outstanding (000)	Sector
Broadcast Centre	30-Jan-97	7.53	1-May-27	\$396,197	Canada
IADB	01-Jan-99	5.625	29-Jun-09	\$500,000	Financial
Halifax	4-Dec-97	5.95	4-Dec-07	\$70,000	Utility
Milit-Air	12-May-98	5.75	30-Jun-19	\$714,442	Financial
Nav	16-Dec-96	5.75	1-Apr-02	\$250,000	Utility
Nav	24-Mar-97	6.45	1-Jun-04	\$250,000	Utility
Nav	16-Dec-96	6.6	1-Dec-06	\$250,000	Utility
Nav	24-Mar-97	7.56	1-Mar-27	\$500,000	Utility
Nav	16-Dec-96	7.4	1-Jun-27	\$250,000	Utility
NewBrunswick (F-M)	5-Mar-98	0	30-Nov-27	\$753,760	Utility
Toronto	8-Dec-98	5.64	8-Dec-22	\$281,000	Industrial
Vancouver International	6-Dec-96	6.55	7-Dec-06	\$150,000	Utility
Vancouver International	6-Dec-96	7.375	7-Dec-26	\$150,000	Utility

## RBC CM SUB-INDICES

RBC CM sub-indices are determined by combinations of sector (Canada, Provincial, Municipal, Corporate and corporate sub-sectors Industrial, Financial, and Utility), maturity (Short, Intermediate and Long), and corporate credit rating (AA or better, A, BBB). Sub-indices for individual provinces and more detailed corporate sub-sectors are available on request.

The RBC CM Canadian Bond Market sub-indices include:

Canadas	All Canadas that are included in the Index
Provincials	All Provincials that are included in the Index
Municipals	All Municipals that are included in the Index
Governments	Canada Index, Provincial Index, and Municipal Index
Corporates	All Corporates that are included in the Index
AA+	All AAAs and AAs in the Corporate Index
A	All As in the Corporate Index
BBB	All BBBs in the Corporate Index
Financial	All Financials in the Corporate Index
Industrial	All Industrials in the Corporate Index
Utility	All Utilities in the Corporate Index

Bonds are also categorised by time-to-maturity (TTM) at each month end. The RBC CM Canadian Bond Market Index and the major sector sub-indices are divided into Short, Intermediate, and Long according to the following criteria designed to appropriately capture the large number of bonds with maturity dates on the first day of a month:

Short	1 year + 2 days	<= TTM	< 5 years+2 days
Intermediate	5 year + 2 days	<= TTM	< 10 years+2 days
Long	10 year + 2 days	<= TTM	

Other indices available as of May 1998 include:

### RBC CM Canadian High Yield Bond Index:

- Rated below BBBL.
- Other inclusion criteria similar to the RBC CM Canadian Bond Market Index.

### RBC CM Canadian Money Market Indices:

- Three-month, six-month, and twelve-month maturities.

## INDEX RETURNS

### CURRENT METHODOLOGY

(starting June 30, 1997)

## INDEX CALCULATION DETAILS

On June 30, 1997 the methodology used to calculate total returns for the Index was changed to reflect the reinvestment of cash flows on a daily basis at the Index return rather than reinvestment at the T-Bill rate through month end. Historical Index returns were not restated.

The daily Index return is the weighted average of the individual bond returns from the close of business day  $t$  to the close of business day  $t+1$ . The weights are the proportion of the market value (price plus accrued on day  $t$  times amount outstanding net of strip) of each bond to the total market value of the Index portfolio at the end of day  $t$ . The weights change daily to reflect changes in prices and accrued interest and coupon and mandatory sinking fund payments.

Monthly Index returns are calculated as the cumulative daily returns throughout the month. If a month ends on a weekend, the monthly return reflects prices on the last business day of the month and accrued interest, coupon and sinking fund cash flows as of the last calendar day of the month.

The value of a bond at the start of the period is the sum of the price and accrual amount at that time. The daily return on a bond is simply the percentage change in value from one day to the next plus any coupon or sinking fund cash flow received on day  $t+1$ . If the bond has a sinking fund payment, the cash flow is incorporated in the return and the holdings of the bond are adjusted down to reflect the new smaller amount outstanding. If coupon or sinking fund cash flows occur on a weekend, they are assumed to earn no additional interest income over the weekend.

$$r_i^{t+1} = \frac{V_i^{t+1} (H_i^t - SF_i^{t+1}) - V_i^t H_i^t + C_i^{t+1} H_i^t + SF_i^{t+1}}{V_i^t H_i^t} \cdot 100$$

where:

$$V_i^t = P_i^t + A_i^t$$

$P_i^t$  = market closing bid price of the  $i$ th bond on day  $t/100$

$A_i^t$  = accrual amount of the  $i$ th bond at time  $t/100$

$C_i^{t+1}$  = coupon cash flow of the  $i$ th bond on day  $t+1$

$SF_i^{t+1}$  = sinking fund cash flow of the  $i$ th bond on day  $t+1$

$H_i^t$  = amount outstanding of the  $i$ th bond on day  $t$  (net of strip as of previous month end)

Note that in the absence of a coupon or sinking fund cash flow ( $C=0$ ,  $SF=0$ ), the individual bond return equation reduces to:

$$r_i^{t+1} = \frac{V_i^{t+1} - V_i^t}{V_i^t} \cdot 100$$

The Index return equation is:

$$r_p^{t+1} = \sum_{i=1}^n W_i^t \cdot r_i^{t+1}$$

where:

$r_p^{t+1}$  = total return to the Index portfolio on day  $t+1$

$W_i^t$  = weight of the  $i$ th bond in the Index portfolio at the end of day  $t$

$r_i^{t+1}$  = total return to the  $i$ th bond in the Index portfolio on day  $t+1$

$n$  = total number of bonds in the Index portfolio

The weight of bond  $i$  in the Index is defined as:

$$W_i^t = \frac{(P_i^t + A_i^t) \cdot H_i^t}{\sum_{i=1}^n (P_i^t + A_i^t) \cdot H_i^t}$$

### **OLD METHODOLOGY**

(from December 31, 1987 to  
June 30, 1997)

Prior to June 30, 1997, market value weights on individual bonds in the Index were held constant throughout the month rather than revalued every day. The total return included changes in price and accrual amounts since the previous month end as well as all cash flows (principal and coupon) received in the course of the month and reinvestment income on these cash flows up to the day of the return calculation.

Prior to June 30, 1997, these cash flows were reinvested at the one-month risk-free rate and the income generated from this reinvestment was included in the total return for the bond. Daily Index levels were created from month-to-date returns.

The bond return equation was:

$$r_i^{t+1} = \left\{ \left[ \frac{V_i^{t+1} - V_i^t}{V_i^t} \right] + \left[ \frac{C + C_{reinv}}{V_i^t} \right] + \left[ \frac{(L + L_{reinv}) - (V_i^{t+1} \cdot h)}{V_i^t} \right] \right\} \cdot 100$$

where:

- $r_i^{t+1}$  = return to the *ith* bond on day  $t+1$
- $V_i^{t+1}$  = value of the *ith* bond on day time  $t+1$  (the end of the return period)
- $V_i^t$  = value of the *ith* bond at time  $t$  (the previous month end)
- $C$  = coupon repayment received in period  $t$  to  $t+1$
- $C_{reinv}$  = reinvestment income earned on received coupon payment
- $L$  = principal payment received in period  $t$  to  $t+1$
- $L_{reinv}$  = reinvestment income earned on received principal payment
- $h$  = proportion of principal retired in period  $t$  to  $t+1$

*Return Equation Has Three Terms*

The bond return equation has three terms: the first term measures the return due to change in value (price+accrued) of the bond; the second term, measures the return due to coupon ( $C$ ); the third term measures the return due to principal cash flows received ( $L$ ) and the reinvestment income from this cash flow. The third term also accounts for the proportion of principal retired during the period due to sinking fund payments ( $h$ ) and its impact on the bond return.

**a) Return due to Change in Value**

$$\left[ \frac{V_i^{t+1} - V_i^t}{V_i^t} \right]$$

where:  $V_i^t = P_i^t + A_i^t$

$P_i^t$  = market bid price of the *ith* bond at time  $t$

$A_i^t$  = accrual amount of the *ith* bond at time  $t$

**b) Return due to Coupon and Coupon Reinvestment**

$$\left[ \frac{C + C_{reinv}}{V_i^t} \right]$$

Coupon received from bonds in the middle of the month was held in a cash position in the Index portfolio. The cash position was reinvested to the end of the month at the one-month risk-free rate (T-bill rate) as of the previous rebalancing date.

The reinvestment income was calculated as follows:

$$C_{reinv} = C \cdot (e^{st} - 1)$$

where:

- $C$  = coupon payment received (typically half the coupon interest rate)
- $s$  = 1 month risk free spot rate (T-bill rate expressed as a continuously compounded rate)
- $t$  =  $d/365.25$
- = reinvestment period (time to following month-end, in years)
- $d$  = reinvestment period (time to following month-end, in days)

The continuously compounded one-month risk-free spot rate was used simply as a matter of mathematical convenience. The reinvestment equation was mathematically equivalent to reinvesting the cash flows to month end at the quoted T-bill rate. It did not mean that the received cash flows were reinvested daily at the daily T-bill rate. Any cash flow received was reinvested to month end at the T-bill rate at the start of the return period. This T-bill rate was converted to a continuously compounded spot rate and then used in the reinvestment equation above. For example, on August 31, 1996 the quoted T-bill rate was 4.42%. The continuously compounded risk-free spot rate derived from this was 4.37%. The equation for this conversion is:

$$s = \log \left[ \left( 1 + \frac{y}{200} \right)^2 \right]$$

where:

- $s$  = continuously compounded risk-free spot rate
- $y$  = one month T-bill quoted yield
- $\log$  = natural logarithm

### c) Return due to Principal Received and Reinvestment

$$\left[ \frac{(L + L_{reinv}) - (V_i^{t+1} \cdot h)}{V_i^t} \right]$$

The first part of this term accounts for the principal received ( $L$ ) and the reinvestment income earned on this cash flow. The second part adjusts the bond return for the proportion of the bond that is retired ( $h$ ) due to a mandatory sinking fund payment. The reinvestment computation was similar to the coupon reinvestment:

$$L_{reinv} = L \cdot (e^{st} - 1)$$

For a bond with a mandatory sinking fund at par,  $L$  is equal to par.

The Index return was the weighted average of the individual bond returns. The weights were the proportion of market value (price plus accrued) of each bond to the total market value of the Index portfolio as of the month-end rebalancing date. The weights were held constant throughout the month.

The Index return equation was:

$$r_p^{t+1} = \sum_{i=1}^n W_i^t \cdot r_i^{t+1}$$

where:

$r_p^{t+1}$  = total month-to-date return on the Index portfolio at time  $t+1$

$W_i^t$  = weight of the  $i$ th bond in the Index portfolio at month end  $t$

$r_i^{t+1}$  = total month-to-date return to the  $i$ th bond in the Index portfolio at time

$n$  = total number of bonds in the Index portfolio

The weight in the Index was defined as:

$$W_i^t = \frac{(P_i^t + A_i^t) \cdot H_i^t}{\sum_{i=1}^n (P_i^t + A_i^t) \cdot H_i^t}$$

where:

$P_i^t$  = closing market bid price of the  $i$ th bond on business day  $t/100$

$A_i^t$  = accrual amount of the  $i$ th bond on the last calendar day of month  $t/100$

$H_i^t$  = holdings of the  $i$ th bond in the index portfolio at month end time  $t$

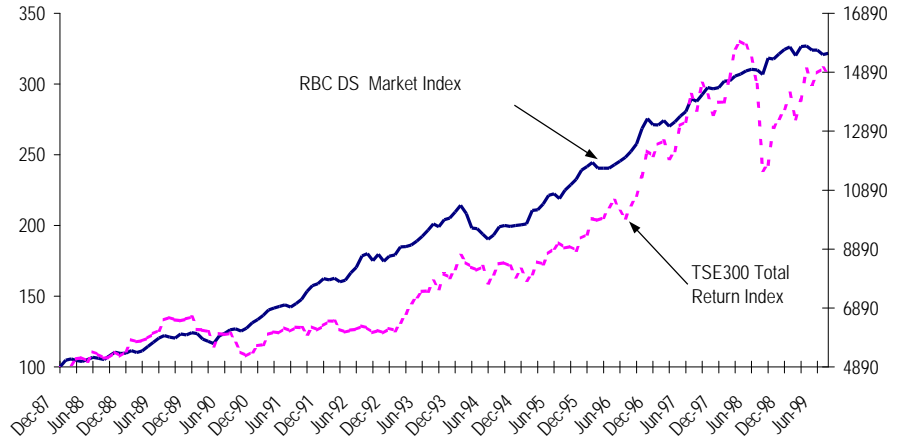
Returns used to calculate the Index value each day were month-to-date returns. Daily Index returns were calculated as the percentage change in the closing Index values for each day.

## APPENDIX I – HISTORICAL INDEX RETURNS

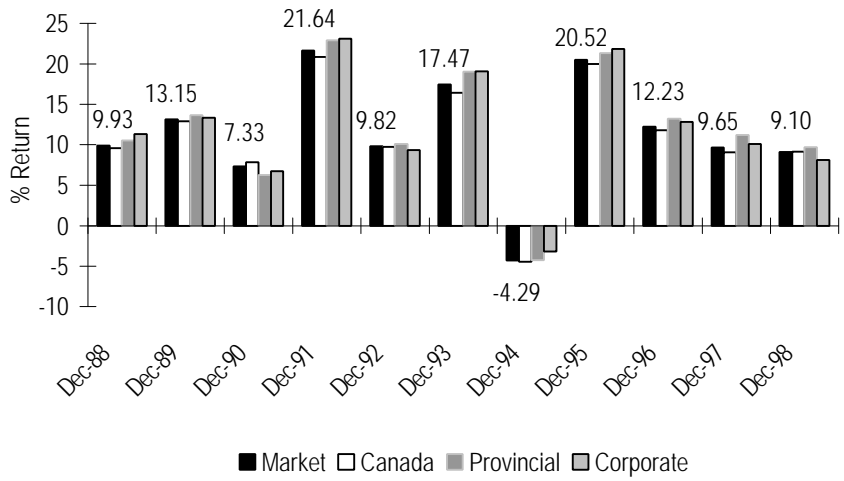
*Annualized Returns As Of December 31, 1998*

	Horizon in Years:										
	1	2	3	4	5	6	7	8	9	10	11
<b>Market Index</b>	9.10%	9.38%	10.32%	12.79%	9.14%	10.49%	10.39%	11.74%	11.24%	11.43%	11.29%
<b>Governments</b>	9.30%	9.45%	10.35%	12.77%	9.10%	10.43%	10.35%	11.69%	11.20%	11.39%	11.25%
<b>Canadas</b>	9.16%	9.12%	10.00%	12.42%	8.82%	10.06%	10.01%	11.32%	10.93%	11.13%	10.98%
<b>Provincials</b>	9.69%	10.45%	11.37%	13.78%	9.92%	11.39%	11.21%	12.61%	11.88%	12.06%	11.92%
<b>Municipals</b>	9.54%	One year of annualized history since this sector was introduced in May 1997.									
<b>Corporates</b>	8.12%	9.11%	10.34%	13.10%	9.64%	11.16%	10.90%	12.36%	11.72%	11.88%	11.83%
<b>Industrials</b>	6.78%	7.78%	9.41%	12.11%	9.06%	10.62%	10.38%	11.73%	11.15%	11.34%	11.33%
<b>Financials</b>	7.51%	7.94%	9.36%	12.28%	9.02%	10.64%	9.46%	10.99%	10.52%	10.76%	10.69%
<b>Utilities</b>	9.31%	10.62%	11.45%	14.13%	10.32%	11.76%	11.80%	13.27%	12.53%	12.62%	12.53%
<b>AA and higher</b>	7.92%	8.49%	9.78%	12.85%	9.32%	10.76%	10.74%	12.31%	11.72%	11.86%	11.81%
<b>A</b>	8.53%	9.73%	10.76%	13.34%	9.88%	11.33%	10.80%	12.32%	11.68%	11.88%	11.82%
<b>BBB</b>	6.54%	7.83%	9.83%	12.81%	9.58%	11.63%	11.29%	12.41%	11.70%	11.85%	11.82%
<b>Short Index</b>	6.62%	5.78%	7.38%	9.35%	7.19%	8.19%	8.26%	9.37%	9.49%	9.60%	9.52%
<b>Governments</b>	6.63%	5.74%	7.34%	9.29%	7.14%	8.12%	8.20%	9.32%	9.44%	9.56%	9.48%
<b>Canadas</b>	6.57%	5.65%	7.27%	9.25%	7.10%	7.99%	8.06%	9.15%	9.30%	9.41%	9.34%
<b>Provincials</b>	6.87%	6.18%	7.68%	9.49%	7.32%	8.52%	8.63%	9.83%	9.87%	9.99%	9.91%
<b>Municipals</b>	6.77%	One year of annualized history since this sector was introduced in May 1997.									
<b>Corporates</b>	6.61%	6.11%	7.75%	9.90%	7.76%	9.00%	8.86%	10.05%	10.06%	10.18%	10.13%
<b>Industrials</b>	6.19%	5.85%	7.67%	9.77%	7.79%	9.05%	9.09%	10.30%	10.30%	10.42%	10.46%
<b>Financials</b>	6.33%	6.08%	7.85%	10.13%	8.02%	9.42%	8.44%	9.68%	9.58%	9.74%	9.69%
<b>Utilities</b>	7.52%	6.37%	7.76%	9.87%	7.55%	8.69%	8.86%	9.98%	10.05%	10.17%	10.15%
<b>Intermediate Index</b>	9.09%	9.42%	10.51%	13.24%	9.27%	10.78%	10.57%	12.09%	11.55%	11.69%	11.46%
<b>Governments</b>	9.34%	9.60%	10.61%	13.31%	9.28%	10.77%	10.58%	12.09%	11.55%	11.69%	11.45%
<b>Canadas</b>	9.46%	9.76%	10.66%	13.33%	9.18%	10.58%	10.40%	11.88%	11.42%	11.54%	11.31%
<b>Provincials</b>	8.88%	9.03%	10.38%	13.17%	9.39%	11.03%	10.85%	12.41%	11.73%	11.91%	11.67%
<b>Municipals</b>	9.30%	One year of annualized history since this sector was introduced in May 1997.									
<b>Corporates</b>	8.01%	8.64%	10.11%	13.05%	9.48%	11.13%	10.73%	12.27%	11.71%	11.84%	11.74%
<b>Industrials</b>	6.88%	8.46%	10.13%	13.31%	9.65%	11.44%	11.04%	12.50%	11.91%	12.00%	11.88%
<b>Financials</b>	8.40%	9.36%	10.66%	13.46%	9.74%	11.37%	10.66%	12.26%	11.67%	11.84%	11.75%
<b>Utilities</b>	8.34%	8.05%	9.57%	12.39%	9.06%	10.52%	10.45%	12.02%	11.51%	11.67%	11.57%
<b>Long Index</b>	12.77%	15.57%	15.15%	17.89%	12.36%	13.84%	13.51%	14.84%	13.64%	13.84%	13.64%
<b>Governments</b>	13.28%	15.90%	15.34%	18.05%	12.41%	13.88%	13.55%	14.88%	13.66%	13.88%	13.66%
<b>Canadas</b>	14.06%	16.35%	15.40%	17.99%	12.28%	13.65%	13.38%	14.65%	13.51%	13.75%	13.51%
<b>Provincials</b>	12.27%	15.37%	15.49%	18.42%	12.83%	14.46%	14.01%	15.42%	14.05%	14.19%	14.03%
<b>Municipals</b>	11.86%	One year of annualized history since this sector was introduced in May 1997.									
<b>Corporates</b>	10.25%	13.88%	14.20%	17.06%	12.32%	13.75%	13.37%	14.73%	13.62%	13.69%	13.56%
<b>Industrials</b>	7.37%	12.64%	13.68%	16.59%	11.98%	13.25%	12.74%	13.67%	12.55%	12.72%	12.66%
<b>Financials</b>	10.33%	13.95%	14.07%	17.45%	11.85%	13.26%	4.08%	6.20%	5.97%	6.96%	7.30%
<b>Utilities</b>	10.55%	14.01%	14.28%	17.07%	12.36%	13.80%	13.74%	15.16%	14.04%	14.06%	13.90%

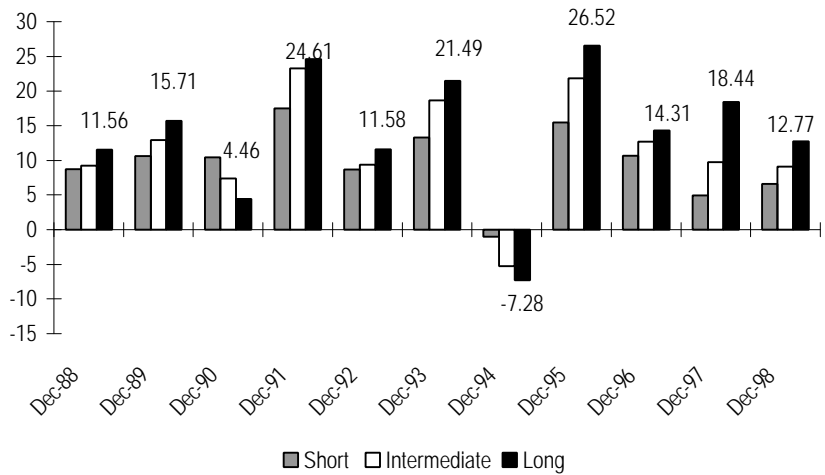
*Total Returns: Index  
vs. TSE 300 (%)*



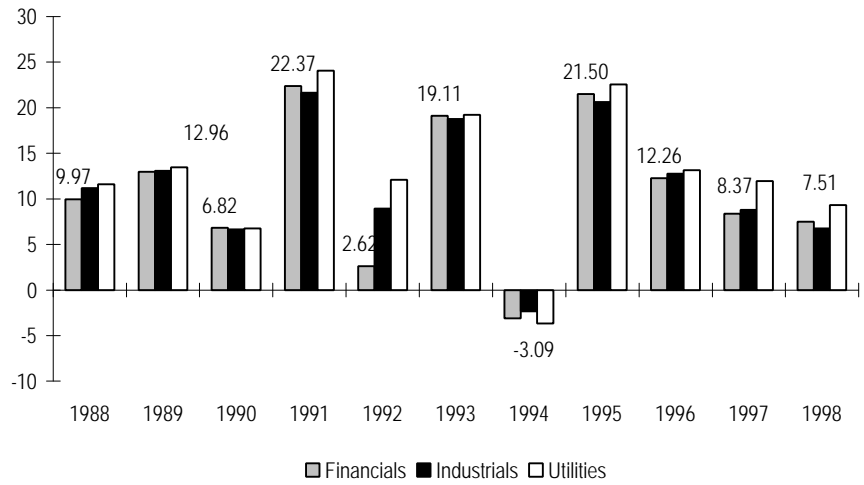
*Index Annual Returns: Market,  
Canada, Provincial, Corporate  
(%)*



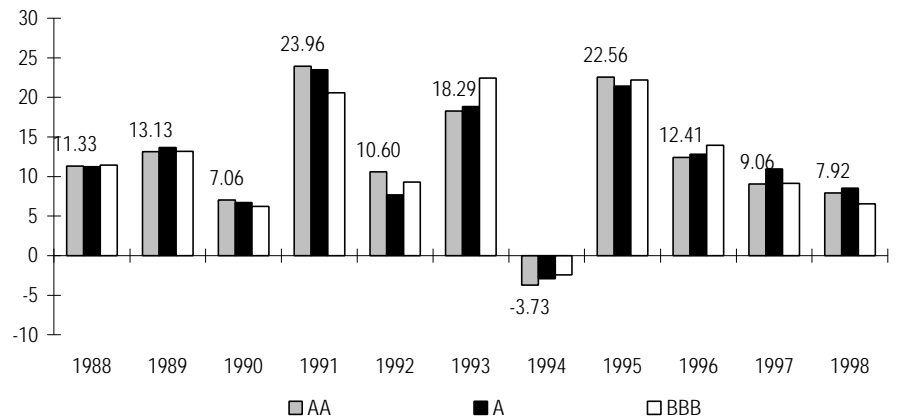
*Annual Returns: Short,  
Intermediate and Long (%)*



*Corporate Sub-sector Annual Returns (%)*

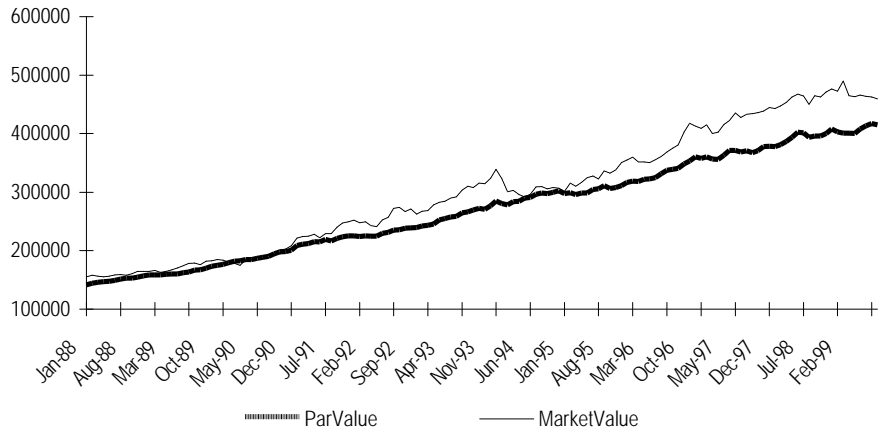


*Corporate Rating Sub-sector Annual Returns (%)*

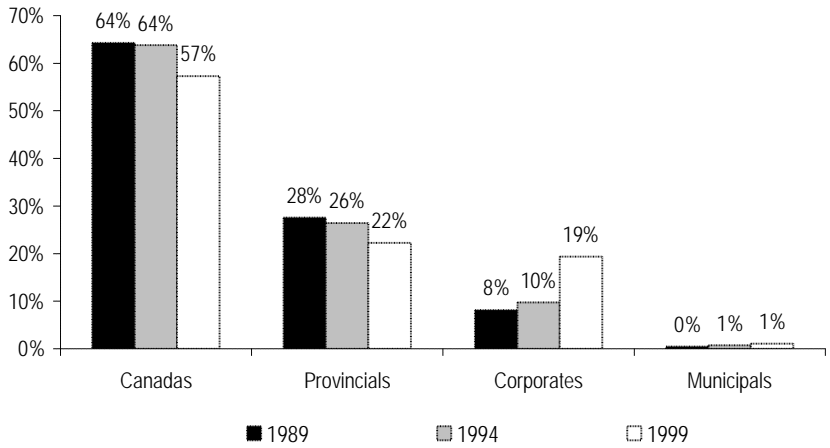


## APPENDIX II – INDEX CONSTITUENTS

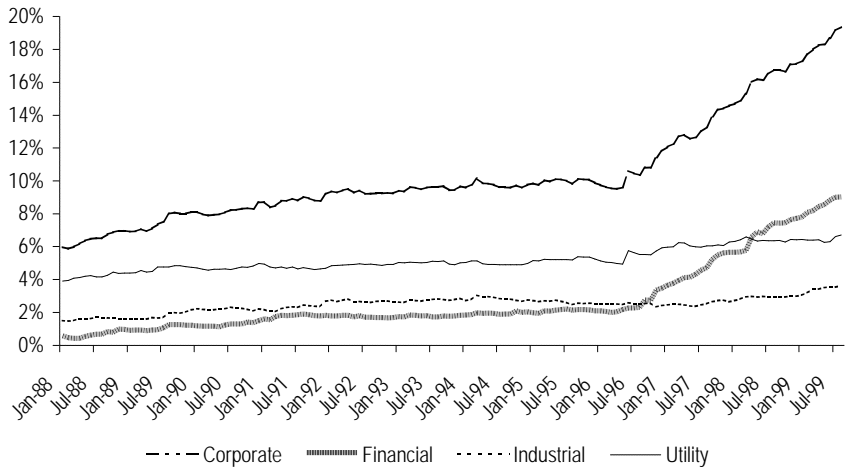
*Par Amount & Market Value  
Outstanding Net of Strip and  
Reconstitution*



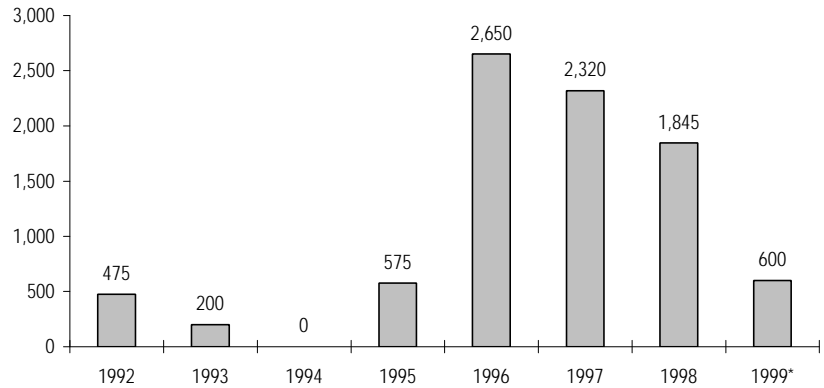
*Sector Weight History –  
Corporate sector growth at  
the expense of Canadas and  
Provincials. Expect Corporate  
weight over 20% by  
January 1, 2000*



*Corporate Sector Weight –  
Growth mainly due to  
Financials*

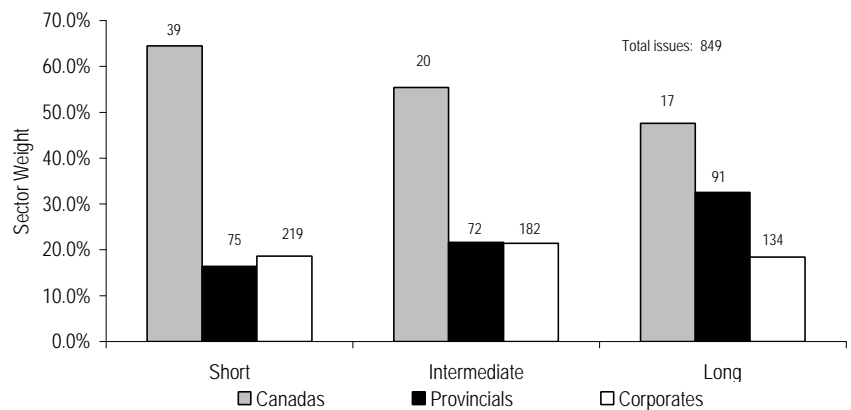


*Eligible Bank Fixed Floater Issuance (\$MM) – Added to Index September 30, 1996*

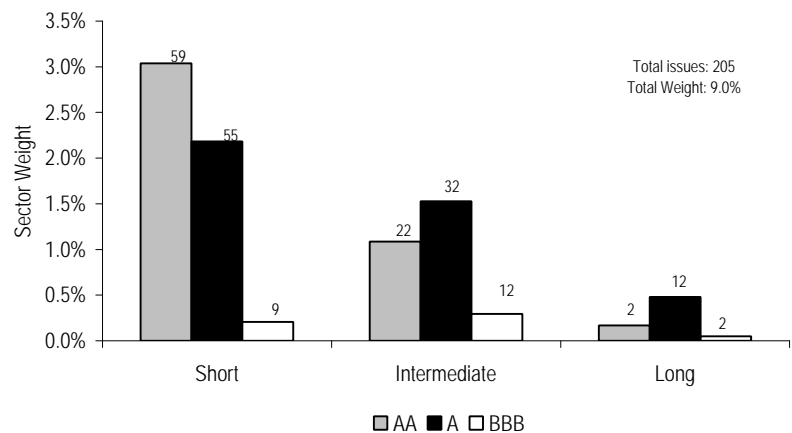


\*Value as of 8/31/99

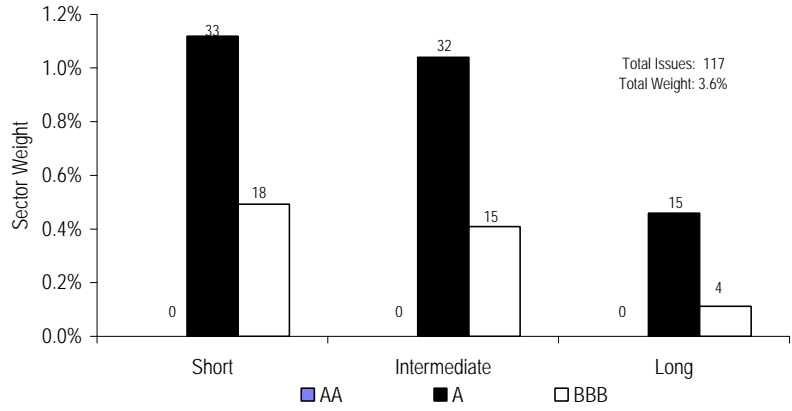
*Sector Weight in Index by Maturity Sub-index August 31, 1999 (Number of issues) – Canadas Dominate the Short Index*



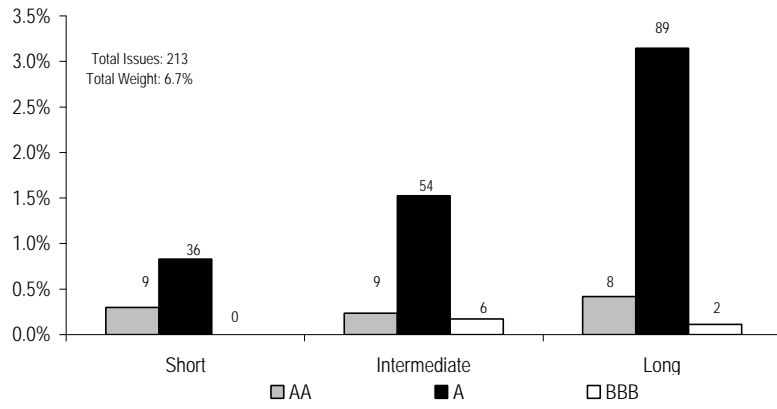
*Financial Sector Weights by Maturity Sub-index August 31, 1999 (Number of issues) – Financials are mainly AA and are concentrated in the Short and Intermediate Sectors*



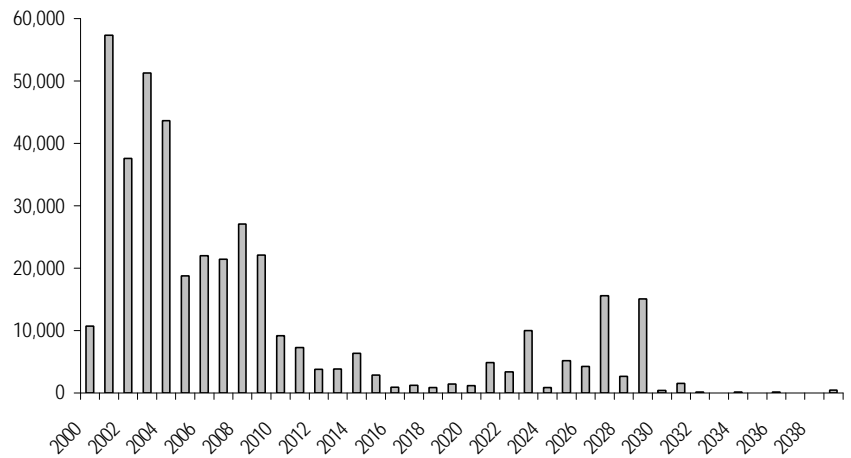
*Industrial Sector Weights by  
Maturity Sub-index  
(Number of Issues)  
August 31, 1999*



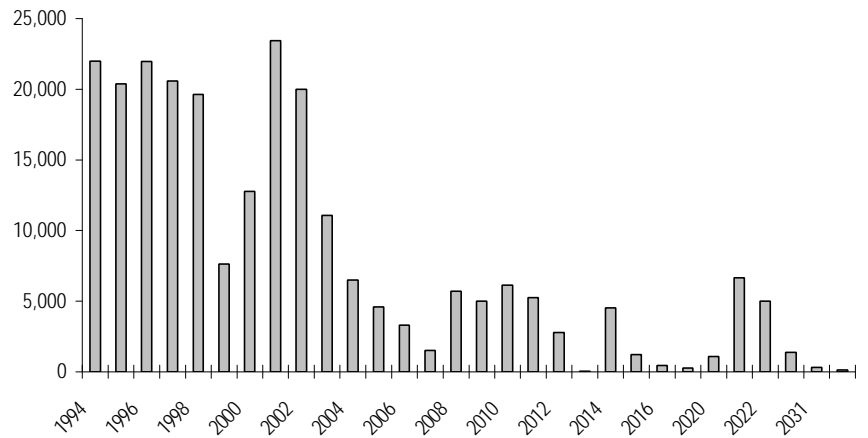
*Utility Sector Weights by  
Maturity Sub-index  
(Number of Issues)  
August 31, 1999 –  
Utilities are concentrated in  
the A sector and in the  
Long Index*



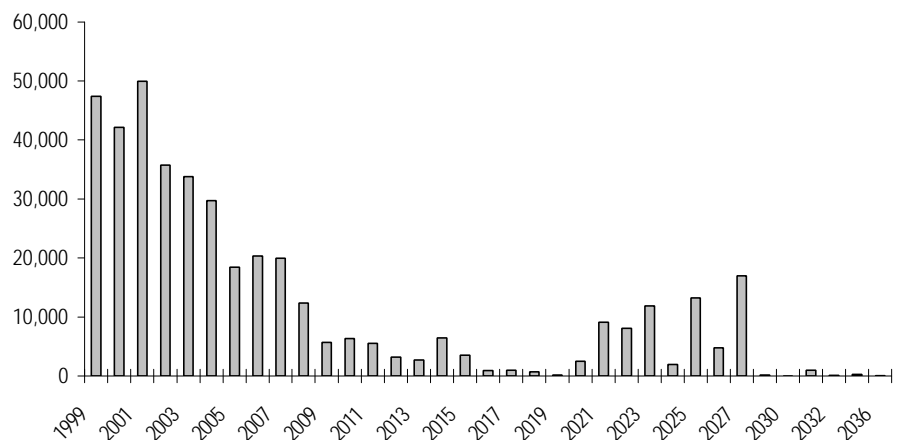
**PAR VALUE MATURITY  
PROFILE (\$MM)**  
August 31, 1999



*December 31, 1992*

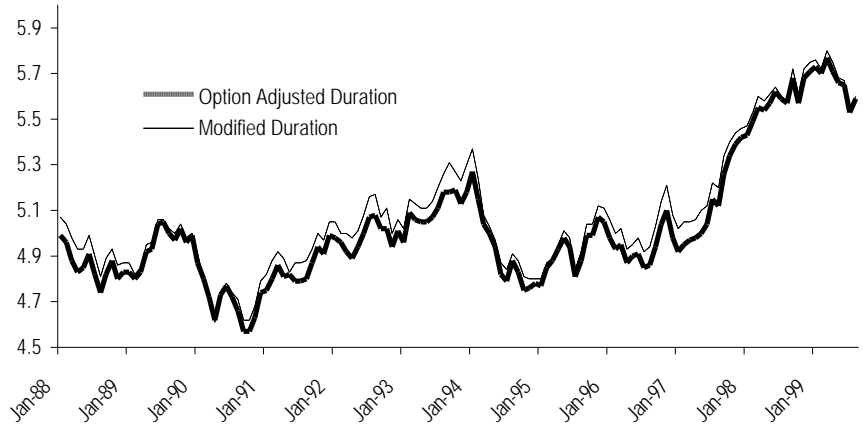


*December 31, 1997*

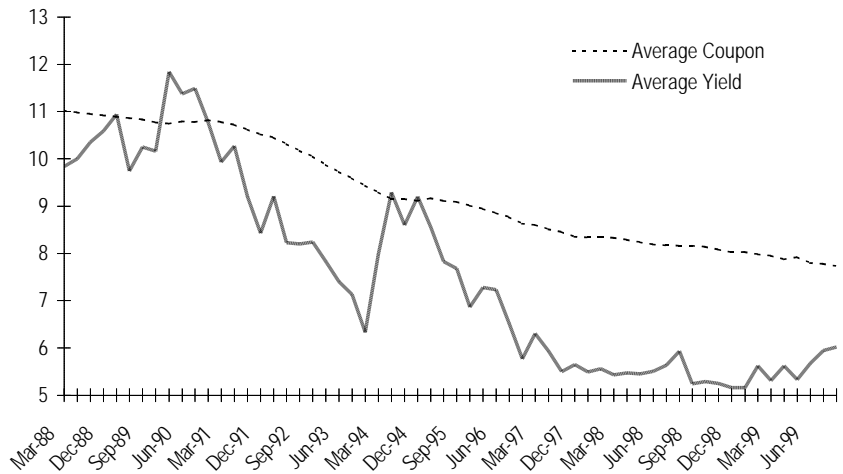


## APPENDIX III – INDEX CHARACTERISTICS

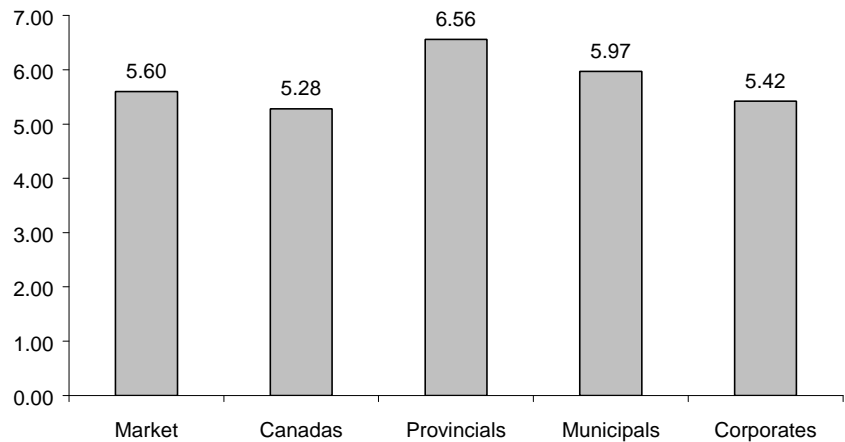
*Modified & Option-Adjusted Duration (Years)  
–Duration has extended as yields have fallen in recent years*



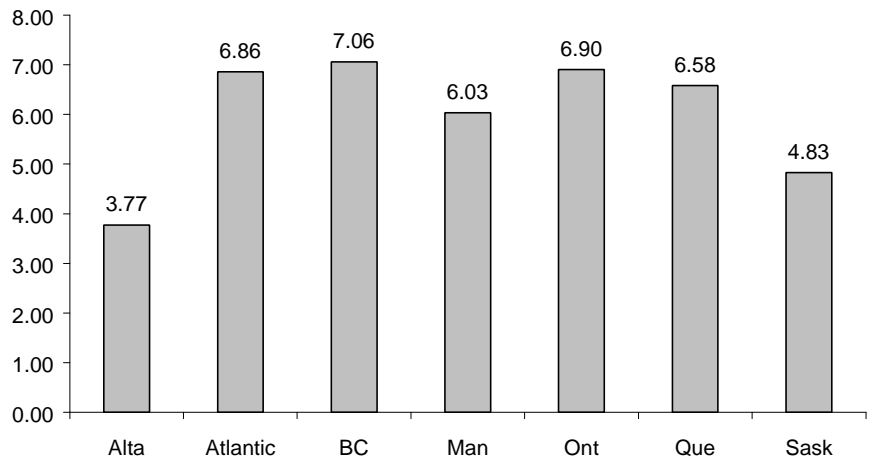
*Average Yield and Coupon (%)*



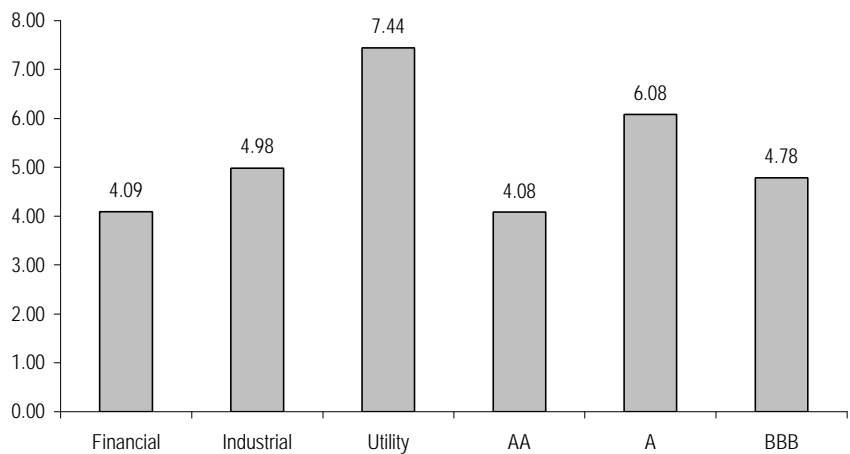
*Modified Duration by Sector  
(Years) August 31, 1999 –  
Canadas are shorter on  
average than Provincials*



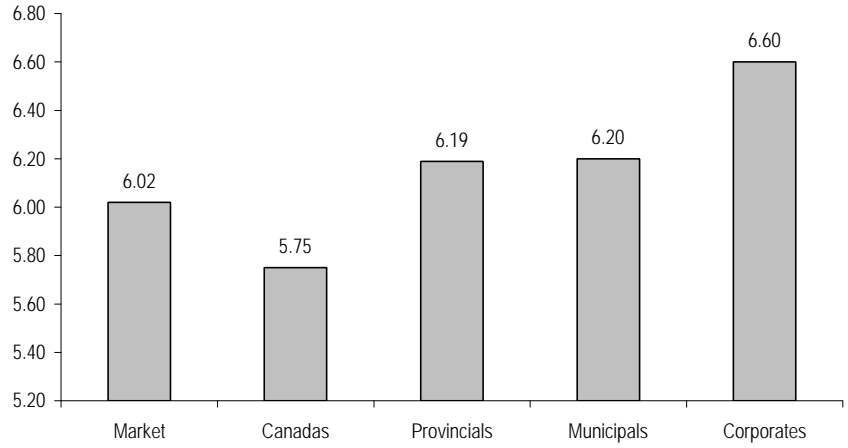
*Modified Duration by  
Province (Years)  
August 31, 1999 –  
Alberta and Saskatchewan  
are much shorter than others  
on average*



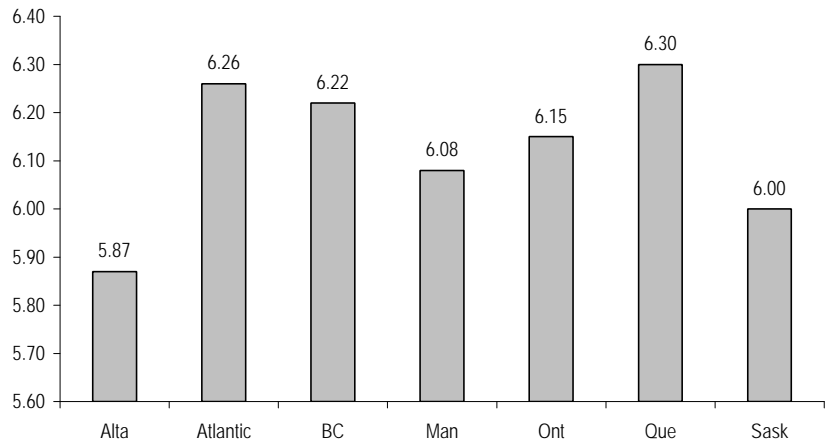
*Modified Duration by  
Corporate Sector (Years)  
August 31, 1999*



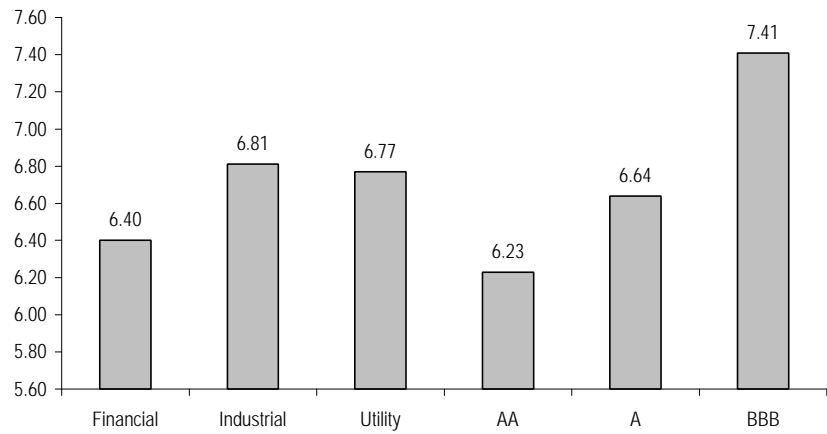
*Average Yield by Sector (%)  
August 31, 1999*



*Average Yield by Province (%)  
August 31, 1999*



*Average Yield by Corporate Sector (%)  
August 31, 1999*



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