



BY LAURENCE BOOTH

EQUITY MARKET RISK PREMIUMS IN THE U.S. AND CANADA



The bond market has recently been almost as risky as the equity markets.

In the Spring 1995 issue of *Canadian Investment Review*¹ I reported on the extent to which equities had outperformed long-term bonds and treasury bills in Canada over various investment horizons. Subsequently, I have been asked many times whether the overall results have remained the same. After all, many things have changed since the basic data series of that paper ended in 1994. For one thing, the Government of Canada has got its finances under control, which has had a major impact on the bond market, even to the extent of raising the question of whether there is now a “scarcity premium” attached to long-term Canada bond prices. We have also had the impact of the continuing bull market in the U.S. spilling over into Canada, raising the question of whether U.S. data can be used as a check on the validity of Canadian estimates. Some have even questioned whether Canadian capital market data remains relevant in a world of crumbling investment barriers to international diversification.

This paper will answer these questions and in the process “update” the basic results from my 1995 *Canadian Investment Review* paper. To preface the major results, the statistical evidence remains very similar: equities have outperformed bonds by about 3% over the last 40-plus years where we have reliable data. However, much of this “poor” performance relative to earlier periods, for example 1924-1956, is due not so much to poor equity market performance, but changed conditions in the bond market. The advent of deficit financing by all layers of government increased the level of interest rates, driving bond market performance down through the 1970s, and conversely up through the 1990s, as the long secular interest rate cycle reversed. Similar effects were at work in the U.S. through the same periods.

Abstracting from the effects of this long interest rate cycle, equities performed much as they have done in previous periods. However, since much of the risk of investing in long Canadas has dissipated, risk premiums of equities over long Canadas are about 1.0% higher today than they were in 1995. Consequently, equities will probably outperform bonds by about 4.5% a year for one-year investment horizons. As the investment horizon is lengthened, this 4.5% premium will get narrower.

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THE BASIC RESULTS

The main source of the data is the Canadian Institute of Actuaries data for Canada and the “Ibbotson and Siqufield” data for the U.S. To ensure compatibility, the common period 1926-2000 is used, even though the Canadian data goes back to 1924 and equivalent quality data in the U.S. is available back to 1871.² In both cases, the most recent data is added using the same original sources, since “official” data for 1926-2000 is not yet available.

Equity risk premiums are normally determined with respect to long-term bond yields, since short-term Treasury bill yields fluctuate over the business cycle in response to short-term monetary policy. As a result, they are not indicative of long-term expectations. Experienced risk premiums are then simply the return earned on equities minus the return earned on long-term bonds. Going back over long periods of time is then an attempt to ensure that the random experiences of a few good or bad years do not create unrealistic expectations for the future.

The following graph shows the experienced returns for the overall period 1926-2000.

Here, the three estimates of the annual return are the average annual arithmetic mean (AM) return, the annual compound or geometric mean (GM) return and the ordinary least squares or regression estimate of the arithmetic mean return (OLS).³

In Canada the equity series is the TSE 300 back to 1956, prior to that it is a series of equity returns that the CIA spliced together. In the U.S. the equity series is the Standard and Poor’s 500 index. In both cases dividends are reinvested so that the returns are total investor returns. The AM averages in both the U.S. and Canada are very similar, TSE equities averaged 11.83% and the S&P 500 12.98%. The AM average is an estimate of the expected return over a one-year horizon. In contrast, the geometric or compound return is an estimate of the rate of return over the whole 74-year

period. In this case, the return falls to 11.04% in the U.S. and 10.21% in Canada. The difference between the AM and GM returns of 1.62% in Canada and 1.85% in the U.S. is due to the volatility of the annual returns. Over the complete period, the standard deviation (or volatility) of the annual returns in the U.S. was 20.17% and in Canada 18.64%.

In contrast to the equity returns, the AM bond returns were 5.69% in the U.S. and 6.37% in Canada, while the GM returns were 5.29% and 6.0% respectively. The difference between the AM and GM bond returns of 0.40% in the U.S. and 0.37% in Canada is much smaller than that for equities because the annual returns over the whole period have been less volatile. For Canada the volatility of bond returns was 9.18%, whereas in the U.S. it was 9.47%. In both cases, bond returns were less than half as risky as equity returns over the whole period.

The central message from the data seems to be clear: U.S. common equities have earned between 11.04-12.98% and long Treasuries 4.45-5.69%, depending on the estimation method. Consequently, the excess return of U.S. equities over long treasuries has been in the range 6.70-7.29% for annual holding periods (OLS & AM), declining to 5.75% as the holding period is lengthened (GM). For Canada, the excess return of TSE equities over long Canada bonds was 5.41-5.46% for annual holding periods, declining to 4.22% as the holding period lengthens.

The realized U.S. equity risk premium is higher at 6.70-7.29% than the Canadian equivalent at 5.41-5.46%. Given the higher “quality” of the U.S. data, many put greater faith in U.S. estimates, even for the Canadian market. This is also frequently justified by the doubt expressed at the higher-risk Canadian market having a lower-risk premium, despite the fact that historically the U.S. market has been riskier than the Canadian market. Finally, the increasing “integration” of the two capital markets is frequently used to justify

Annual Rate of Return Estimates 1926-2000

	U.S.			CANADA		
	S&P EQUITIES	LONG U.S. TREASURY	EXCESS RETURN	TSE EQUITIES	LONG CANADAS	EXCESS RETURN
AM	12.98	5.69	7.29	11.83	6.37	5.46
GM	11.04	5.29	5.75	10.21	6.00	4.22
OLS	11.16	4.45	6.70	10.52	5.11	5.41
Volatility	20.17	9.47		18.64	9.18	



looking at U.S. data with the implicit assumption that Canadian market experience will somehow move closer to the U.S. experience.

However, the difference between the U.S. and Canadian AM risk premiums of 1.83% is due to an equity return difference of 1.15% and a bond return difference of 0.68%. The difference is split approximately 2:1 equity versus bond markets. The difference between the equity market returns can partly be explained by the effects of Canadian government policy to deliberately segment the Canadian equity market from that in the U.S.,⁴ as well as by the historically lower risk of the Canadian market. The difference in the bond market returns in turn reflects the pivotal role of the U.S. government bond market in the world capital market and the fact that in a world of government deficits the Canadian market has had to react to changes in the U.S..

However, looking at the equity risk premium in the U.S. and Canada emphasizes the fact that the realized risk premium is just the difference between the realized return on equities minus that on bonds. Here we have to remember that we only use long-time periods to estimate equity returns, since they are so volatile. In contrast, government bond yields immediately tell us what return investors expect from bonds.⁵ Consequently, examining the time path of bond yields allows us to check whether there have been any changes through the long-time period 1926-2000.

BOND MARKET EXPERIENCE

Three interesting observations come from looking at long-term U.S. treasury and Canada bond yields for the period of 1934-2000.

First, yields in both the U.S. and Canada have behaved very similarly, except that Canada bond yields have normally been almost exactly 1.0% higher. This explains the higher bond returns in Canada. Part of the lower equity market risk premium in Canada is thus simply due to higher Canada bond yields, independent of what has happened in the equity market.

Second, in both the U.S. and Canada, yields were basically flat from 1936 to about 1956, indicating very little bond market risk. From 1956-1981, yields then on average increased, causing lower than expected bond market returns. As a result, any risk premium study finishing in 1981 produces biased low equity risk premium estimates since bond returns were lower than expected.



Conversely, bond yields on average declined from 1981-2000, causing higher than anticipated bond market returns. Consequently, any risk premium study only using recent data produces biased low estimates. Finally, interest rates were relatively stable until about 1956, and then not only did they increase and then decline, but they were volatile around the long-term trend.

Analyzing bond market yields indicates that the overall period 1934-2000 is not "homogeneous." Instead, prior to 1956 capital market conditions were different than afterwards. As in my 1995 *Canadian Investment Review* paper I continue to believe that 1956 marks a natural demarcation point in capital market history. This is due mainly to the changes in the government bond markets that occurred in both the U.S. and Canada. In Canada, equity data is only reliable after 1956 and there were significant changes in the taxation of investment income during this time.

The following table gives the estimates for both the U.S. and Canada for the two sub periods 1926-1956 and 1957-2000.

For the earlier period, 1926-1956, the realized return on equities is very similar in both the U.S. and Canada. The AM is 0.50% higher in the U.S., but this is mainly due to the greater equity market volatility in the U.S., since the compound rate of return (GM) is actually 0.19% higher in Canada. In both cases, the great stock market crash pulls down the least squares estimate (OLS). For the bond market, the AM is 0.62% higher and the GM 0.60% higher in Canada. Consequently, the estimated AM and GM excess returns of equities over bonds are 1.12% and 0.42% higher respectively in the U.S. than in Canada. Once we abstract from the greater volatility of the U.S. equity market it is clear that the equity risk premium in Canada was lower simply due to the higher bond yields in Canada.

For the recent period 1957-2000 we get different results. The U.S. AM equity return is basically the same, but since U.S. equity market volatility has declined significantly (from 25% to 16%) the GM equity return actually increased by 1.60%. By contrast, in Canada the AM equity return declined by 1.20% and the GM by 0.14%. Whether we look at arithmetic or compound rates of return, the U.S. equity market has performed marginally better than has the Canadian market since 1956.

For the bond market, both U.S. and Canadian returns have increased dramatically as the yield data would indicate they should. In the U.S., AM returns increased by 3.94% and in Canada by 4.04% with slightly lower



Equities Over Long-Term Bonds in the U.S. & Canada

	S&P 500 EQUITIES	U.S. TREASURIES	EXCESS RETURN	TSE EQUITIES	LONG CANADAS	EXCESS RETURN
1926-1956						
AM	13.05	3.38	9.67	12.55	4.00	8.55
GM	10.11	3.27	6.84	10.30	3.87	6.42
OLS	8.97	3.48	5.52	8.90	3.99	4.90
VOLATILITY	24.88	4.93		22.09	5.41	
1957-2000						
AM	12.93	7.32	5.61	11.33	8.04	3.29
GM	11.71	6.75	4.96	10.16	7.53	2.63
OLS	11.21	7.09	4.12	10.46	7.93	2.54
VOLATILITY	16.37	11.44		16.02	10.85	

increases in compound rates of return. What is striking is that while equity returns have been constant there has been an undeniable increase in bond market returns. From the yield data, it is apparent that interest rates have been much more volatile since the early 1950s. More to the point, bond market risk increased from 4.93% to 11.44% in the U.S. and from 5.41% to 10.85% in Canada. In both cases bond market risk as measured by the standard deviation of returns doubled.⁶

Another way of looking at the data is to look at the relative uncertainty of the equity market as compared to the bond market. To do this, risk is simply measured as the standard deviation of annual returns over the prior 10 years.

It is apparent that, like Canada, the U.S. equity market was much more volatile than the bond market until the mid-1950s. Until then equity markets were about four times as volatile as the bond market and frequently more. After the mid-1950s, however, the increasing uncertainty in the bond market has caused the differences in risk to become less pronounced. For the last 20 years (since the early 1980s) the bond market has been almost as risky as the equity market.

However, from simple portfolio theory, volatility may not measure risk: the question is whether the bond returns are correlated with equity returns. That is, how does the risk of my portfolio change by adding more long-term bonds? How to measure bond market risk depends on the investor's investment strategy, as I discussed recently in the context of foreign bond holdings.⁷ However, if the investment horizon for bonds is the same as that for equities, we can look at bond market "betas." The above graph gives bond market betas in both the U.S. and Canada, where betas are estimated over 10 years of annual data starting in 1926.

Since interest rates barely moved prior to the early 1950s, it is not surprising that bond market betas were insignificantly different from zero. This remained true until the dramatic increases in interest rates in the late 1970s when the central banks in both the U.S. and Canada significantly changed monetary policy to fight inflation. By the mid-1990s bond market betas were in the 0.40-0.60 range, similar to the level of low-risk equities like utilities. Since then bond betas have declined to the 0.20-0.40 range.⁸

The clear indication is that adding bonds to an equity portfolio over the last 20-plus years has increased portfolio risk similar to that of adding low-risk equities like utilities. Conversely, interest rate risk has become an ongoing feature of capital market risk in a way that historically it wasn't. The upshot is that it is apparent that the bond market has recently been almost as risky as the equity market.

INFLUENCE OF GOVERNMENT FINANCING PROBLEMS

It is reasonable to ask what has been causing this. To look at this we have to remember that government bonds only exist as a result of government financing problems: no deficits, no debt!

Until the early 1970s Canadian governments in aggregate ran balanced budgets. However, from 1974 on, net lending shifted into negative, i.e. borrowing, and reached -8.0% of GDP in the early 1980s. The strong economy of the mid-1980s improved the deficit position, but not enough: Canada still had deficit problems when the last recession began in 1989. This caused aggregate deficits to increase still further to 9.0% of GDP in 1992, before fiscal sanity was restored and borrowing switched to genuine net lending in 1997, reaching a 3.37% surplus in 2000.



Clearly, investing in Canada bonds (or U.S. treasuries) was perceived to be risky when governments ran persistent deficits.⁸ The great fear was that the cure would not be the “hard medicine” of spending cutbacks and tax increases, but the “soft medicine” of higher inflation, which is deadly to fixed income investors. Hence, the bond market reaction of higher nominal yields. This was accentuated by the shift in economic policy towards monetary policy (i.e., interest rate changes) as governments lost their degrees of freedom in using their own balance sheets (i.e., fiscal policy, to control the economy). The triumph of monetary policy over fiscal policy can be dated to 1979, when the U.S. Federal Reserve Board changed its monetary targets. Faced with more volatile interest rates and the fear of rampant inflation, it is hardly surprising that investors perceived the bond market as riskier than low-risk common equities!

The table below gives statistical support for this notion. It reports the results of a regression analysis of the real Canada bond yield against various independent variables. The real Canada bond yield is defined as the nominal yield reported by the Canadian Institute of Actuaries minus the average CPI rate of inflation, calculated as the average of the current, past and forward year rate of inflation. The regression model explains 87% of the variation in real Canada yields, and four variables are highly significant. The two “dummy” variables represent unique periods of intervention in the financial markets. Dum1 is for the years from 1940-1951, which were the “war” years, when interest rates were controlled. The coefficient indicates that government controls reduced real Canada yields by about 5.4% below what they would otherwise have been. This of course was the objective of the wartime controls.

Similarly, Dum2 is for the years 1972-1980, which were the oil crisis years, when huge amounts of “petrodollars” were recycled from the suddenly rich OPEC countries back to western capital markets, where they essentially depressed real yields. The sign on Dum2 indicates that, but for this recycling, real yields would have been about 3.7% higher. These dummy variables are included because during these two periods, real yields were known to be affected by special “international” factors.

The remaining two independent variables capture the implications of financing government expenditures. Risk is the standard deviation of the return on the long bonds over the preceding 10 years.⁹ The coefficient on the bond risk variable indicates that for every 1% increase in volatility, real Canada yields increased by about 25 basis points. That is, the effective doubling of the variability in bond returns between the two periods 1924-1956 and 1957-2000 has been associated with an almost 200 basis point increase in real Canada yields, causing an equivalent decline in the equity risk premium.

The deficit variable is the total amount of government lending (from all levels of government) as a percentage of the gross domestic product. The coefficient in the model indicates that for every 1% increase in the aggregate government deficit, real Canada yields have increased by about 25 basis points. That is, increased government borrowing, by competing for funds, has driven up real interest rates. Conversely, the over 3.0% budgetary surplus for 2000 lowered real Canada yields by over 75 basis points, compared to what they would have been with a balanced budget.

The effects of increased interest rate risk and government borrowing are clearly two sides of the same coin. Their effect was to crowd the bond market with risky

FACTORS INFLUENCING THE REAL CANADA YIELD

Dependent variable: Long Canada yield minus the average CPI inflation rate for the past, current and forward year.

Independent variables:	Coefficient	T-Statistic
Constant:	1.328	
Risk: standard deviation of return on Scotia Capital long bond index for prior 10 years.	0.254	4.954
Deficit: aggregate government lending as a % of GDP	-0.254	-7.725
Dum1: dummy variable for years 1940-51	-5.332	-12.127
Dum2: dummy variable for years 1972-80	-3.714	- 8.616
Adjusted R2 of the regression	86.5%	
Sixty five years of data 1936-2000		

long Canada bonds that could only be sold at premium interest rates, frequently to non-residents. This driving-up of Canada bond yields led to the narrowing of the equity market risk premium in the 1990s and the recent large Canada bond betas. The U.S. has experienced similar results to Canada.

The result is that, in both Canada and the U.S., equity risk premiums declined significantly through the mid-1990s, due to the very large increase in bond market risk. At the time of my 1995 *Canadian Investment Review* paper, equity risk premiums were at historically very low levels, due to this dramatic increase in bond market risk. Subsequently, much of this risk has been dissipated as governments have finally got their deficits under control. However, it will be many years until this is reflected in the historic data.

Equity markets haven't changed that much: what has changed is the government bond market.

As for the equity market data, the differences in returns are primarily due to known institutional differences between the U.S. and Canada. However, the dividend tax credit's effect, for example, can't generate equity return differences of 1.50% between the U.S. and Canada, since gross dividend yields are barely 2.0%. It seems instead that U.S. equity returns have exceeded expectations, since they have remained at the 13.0% level, despite a decline in their volatility from 25% to 16%. In contrast, in Canada equity returns have declined by 1.20% as equity market volatility has declined from 22% to 16%.

U.S. capital market experience, therefore, largely corroborates the experience in Canada. Up until recently, the U.S. experience could be regarded as another "independent" set of data, since there were significant barriers to capital flows between the two countries, particularly Canada to the U.S.. However, these barriers are coming down, pension and RRSP restrictions are being lowered, equities are increasingly being cross-listed and derivatives are being used to make U.S. equities "Canadian" for tax purposes. Does this mean that the Canadian capital market experience will be more like that in the U.S. and equities will outperform bonds by

6.0%? The answer to this question is a clear No.

What is driving international diversification is the same fact that drives domestic diversification: risk reduction. Some factors that are priced in Canada can be diversified away in an international portfolio, so that holding foreign stocks creates a less risky portfolio. This is as true of Canadians buying U.S. stocks as it is of Americans buying German or British stocks. In all cases, international diversification lowers overall risk. Once it is recognized that international diversification and globalization lowers risk, the implication is that all equity returns, including U.S. and Canadian returns, will likely be lower in the future than they have been in the past.

SUMMARY

In my 1995 paper, the editor added the title "Equities over bonds, but by how much?" At that time with risky Canada bonds, the answer was probably not much: about 2.5-3.3%! Fast-forward to 2001, with a fiscal surplus and long Canada yields barely at 6.0%, and the answer is probably more like 4.5%. Equity markets haven't changed that much: what has changed is the government bond market. This highlights a critical issue: that keying equity returns off bond market yields by adding a "constant" risk premium is a hazardous business! ♦

- 1 See Laurence Booth, "Equities over bonds, but by how much," *Canadian Investment Review* 8-1, Spring 1995.
- 2 See Laurence Booth, "Estimating the equity risk premium and equity costs: new ways of looking at old data," *Journal of Applied Corporate Finance*, 12-1, Spring 1999.
- 3 If a \$1 investment goes to \$2 and then back to \$1, the geometric, or compound return is 0% and the arithmetic average is 25%. The AM is always greater than the GM return. The OLS estimate is a popular statistical estimate of the AM but suffers the drawback of being affected by extreme outliers.
- 4 The dividend tax credit only applies to dividends from Canadian corporations; foreign withholding taxes apply to foreign source income, while portfolio restrictions exist in tax-preferred plans.
- 5 To estimate excess returns we still have to estimate realized equity minus realized bond returns, since interest rate changes affect both equity and bond returns.
- 6 This slightly overstates the case, since some of this is due to the long cycle in interest rates.
- 7 Laurence Booth, "The case against foreign bonds in Canadian fixed income portfolios," *Canadian Investment Review*, Spring 1998.
- 8 These bond market betas are based on 10 years of annual returns. Estimating bond betas in the conventional way over five years of monthly data produces the same types of estimates, see J. Petit, "Corporate Capital Costs," *Journal of Applied Corporate Finance*, Spring 1999, Figure 4.
- 9 This uses the ScotiaMcLeod long bond index, since a pure Canada bond index is not available.