Seasonal Patterns in Canadian Financial Markets and the Impact of Professional Portfolio Rebalancing: Evidence of Profitable Opportunities

George Athanassakos; Ben Graham Chair in Value Investing; Richard Ivey School of Business, The University of Western Ontario; gathanassakos@ivey.uwo.ca

Using Canadian data for the period 1957-2003, this paper provides evidence in support of the gamesmanship hypothesis. We document strong seasonality in excess returns of Canadian stocks and government bonds. However, the seasonality in the excess returns of the Canadian government bonds is opposite in direction from that of the Canadian stocks. The paper provides support for the popular expression "Sell in May and Go Away", as the average performance of risky securities is higher in the November to April period than the May to October period. The opposite is true for government of Canada bonds. Finally, we examine the seasonal behaviour of aggregate fund flows into stocks and government of Canada bonds to complement the returns based tests of the gamesmanship hypothesis. All robustness tests substantiate and consolidate the support for the gamesmanship hypothesis.

JEL Classification Code: G12, G14

I. INTRODUCTION

How much truth does the popular expression "Sell in May and Go Away" have?[1] Moreover, if the returns of risky securities, such as stocks, exhibit seasonal patterns, how do the returns of risk-free securities, such as government bonds, behave throughout the year? Are seasonal patterns in security returns interlinked? If such patterns exist, what drives them and are there profitable opportunities arising from such behavior of financial securities? This paper purports to investigate and address these questions.

Bouman and Jacobsen (2002) find support for the saying "Sell in May and Go Away" in equity markets around the globe, including Canada for the period 1973 to 1996, but they conclude that this finding, and why it occurs, remains a puzzle as a number of possible explanations they investigate, such as data mining and risk explanations, among others, are rejected. However, Maberly and Pierce (2004) argue that this effect is driven by two outliers, namely October 1987 (the 1987 crash in world equity markets) and August 1998 (the collapse of the Long Term Capital Management hedge fund).

Ogden (2003) finds evidence that US Treasury bond returns also exhibit seasonal behavior which, however, is distinctly different from the seasonal behavior of stocks and high risk corporate bonds. Returns of stocks and high risk bonds tend to be strong at the beginning of the year, while Treasury bond returns tend to exhibit strength towards year end. Ogden (2003) links the seasonality of stocks and Treasury bond returns to economic activity and to the annual cycle view of the US economy. He finds, among other things that "the bulk of annual mean excess returns on US stock and bond portfolios are realized in October through March". Ogden (2003), however, indicates that while some aspects of his findings are consistent with rational behavior, others are consistent with theories developed by behavioral finance and suggests that more research is

necessary to explore such findings. This paper will explore the drivers of security return seasonality in relation to the behavioral explanations.

This paper argues that portfolio rebalancing and gamesmanship by portfolio managers (see Haugen (1990), Haugen and Lakonishok (1988)) drive the seasonal behavior of the returns of stocks and risk-free bonds and it is this behavior that contributes to the opposite seasonal pattern of the returns of these securities in the financial markets.

To understand the gamesmanship argument, one needs to understand the investment decision process. Greenwald et al. (2001, p. 21) describe it best when they say: "Even though most investment dollars are in the hands of institutions, institutions do not make investment decisions; individuals working for institutions do. These people have their own interest and agendas, some of which may not be in line with the interest of the institution for which they work. They also have their own psychologies, over which they may have little control. On the other hand, institutions normally have investment policies that are mandated by authority, which are intended to constrain the decisions of current investment managers".

In this paper, we concentrate on the fact that individuals working for institutions have their own agendas, which may not be in line with those of the institutions they work for.[2] Such principal-agent relationship induces portfolio managers to act on their own behalf, trying to maximize their own wealth, as opposed to that of their clients. This is not unlike the argument on investment fund tournaments, whereby rational portfolio managers attempt to maximize their expected payoffs by revising the composition of their portfolios throughout the year depending on relative performance, given the annual cycle of performance evaluation that is based on the calendar year (see Brown, Harlow and Starks (1996)).

As Greenwald et al. (2001) explain, portfolio managers exhibit herd mentality. They are safe when their portfolios look similar to those of other portfolio managers who invest with the same mandate, as no one loses his/her job because of average performance or holding the same securities as the rest of the peer group. Herding becomes more pronounced around the turn of the year. First, at the beginning of the calendar year, portfolio managers rebalance their portfolios towards risky securities in an effort to beat their benchmarks and make their Christmas bonus. They have twelve months to fix any problems that this strategy may entail. Second, towards the end of the calendar year, portfolio managers "window dress" to spruce up their portfolios by selling stocks that are obscure and have fallen in price and buying up stocks (and other securities, such as government bonds) that have done well and are visible and in the public eye. At the same time, portfolio managers lock in good performance by selling risky stocks and moving to lower risk stocks or risk-free securities to affect their Christmas bonus.[3] "Window dressing" and remuneration-motivated portfolio rebalancing, exacerbated by herding, affect prices and returns of financial securities throughout the year in a predictable way. Risky stocks and high risk bonds are bid up (down) around the turn of the year (later on in the year), whereas low risk stocks and risk-free bonds are bid up (down) towards year end (around the turn of the year).[4] The pattern repeats annually mimicking "window dressing" and the annual performance evaluation cycle of portfolio managers.[5]

In this paper, for the period 1957-2003 and sub-periods, we examine (a) the validity of the popular expression "Sell in May and Go Away" and (b) whether seasonality is present (and persistent) in the excess returns not only of risky securities, but also of risk-free securities by looking at Canadian stock and government bond data.[6] We use such tests as the foundation on which to build support for the gamesmanship hypothesis. Gamesmanship by portfolio managers has implications for both stocks and government bonds. For a convincing case to be made in

favor of portfolio rebalancing and the gamesmanship hypothesis, one has to examine not only the seasonal behavior of stocks, but also that of government bonds.

A series of robustness test will be carried out. Previous studies of stock and bond return seasonality used OLS regressions to test for the significance of seasonal patterns. However, diagnostic tests showed that our security returns data are heteroskedastic and autocorrelated. As a result, in this study, we will use Generalized Methods of Moments (GMM) regressions to produce robust tests of significance for the seasonal patterns in security returns (see Ferson and Harvey (1992)). Moreover, a much longer period than the one used by Bouman and Jacobsen (2002) will be employed, as well as two sub-periods, one inclusive and one exclusive of 1987 and 1998, to examine the robustness of the "Sell in May and Go Away" phenomenon, in light of Maberly and Pierce's (2004) criticism of Bouman and Jacobsen's (2002) paper. The effect of outliers and specific months on the "Sell in May and Go Away" phenomenon will also be examined. Finally, we will examine the seasonal behaviour of aggregate fund flows into stocks and government bonds to complement the returns based tests of the gamesmanship hypothesis. If there is a seasonal pattern in institutional investors' portfolio rebalancing, which impacts stock and government bond prices and returns, we should be able to observe similar seasonality in the aggregate flow of funds in stocks and government of Canada bonds throughout the year.

This paper provides support for the expression "Sell in May and Go Away". The average performance of risky securities is significantly higher in the November to April period than the May to October period. The opposite is true for risk-free securities. Moreover, riskier stocks tend to outperform less risky stocks in the November to April period and underperform in the May to October period. This recurring seasonal pattern in security returns, collaborated by numerous robustness tests, is supportive of the gamesmanship hypothesis.

Finally, the paper provides evidence that had investors invested consistently in risky securities in November to April for the last 47 years and rebalanced their portfolios out of risky securities and into government of Canada bonds (or T-bills) for the remaining annual period, they would have outperformed the market by a significant margin.

Such seasonal behaviour is difficult for the markets to fully eliminate for two reasons. First, it is related to "window dressing" and remuneration-motivated portfolio rebalancing by professional portfolio managers who pursue their own interest year in and year out. Second, seasonality is not consistently observed every year. Unless we have a unified theory to help us anticipate seasonal behaviour on a consistent basis, market participants can not fully arbitrage the seasonal behaviour of financial securities. This is particularly true since professional portfolio managers' survival is based on short term performance metrics (see Brandes (2004, pp. 40 and 42)).

The paper's findings will be particularly useful to individual investors in light of fundamental changes that are taking place in the retirement planning industry.[7] Corporate pension funds that were traditionally structured as defined benefits plans are rapidly changing their structure to defined contributions plans, requiring plan contributors to take personal responsibility for their own financial well being in retirement. Understanding the seasonal behavior of financial markets and the inefficiencies bestowed upon them by institutional factors will help investors secure higher returns and better retirement. Additionally, the paper's findings will be useful to academics modeling investor behavior and the demand for stocks.

The rest of the paper is organized as follows: Section II develops the testable hypothesis. Section III discusses the data and methodology. Section IV presents the empirical results, and robustness tests, while Section V concludes the paper and interprets the findings.

II. TESTABLE HYPOTHESIS

Athanassakos and Schnabel (1994) offer a theoretical articulation of the gamesmanship hypothesis. They develop a simple model of portfolio choice and leisure consumption according to which portfolio allocations early in the calendar year should be more heavily weighted towards risky securities and less heavily weighted towards risk-free securities than later on in the calendar year. They assume that a portfolio manager's incentive pay is based on the year end value of the portfolio under his control. The professional portfolio manager works within a one year time horizon given the frequency with which his performance is monitored and assessed (Shleifer and Summers (1990)). The intuitive rationale for this derives from the manager's ability to make ex-post adjustments to his consumption of leisure. As a result, the manager can tolerate more risk in his portfolio early in the year as remedial action in the form of ex-post adjustment of leisure can be taken if the stock market falls. This theory is also consistent with the tournament interpretation of the investment fund industry (see Brown, Harlow and Starks (1996))

Consistent with the theoretical model of Athanassakos and Schnabel (1994), in this paper, we argue that if the gamesmanship hypothesis is correct, we should observe seasonality in the excess returns not only of risky securities (especially smaller stocks), but also in the excess returns of well known, large, low risk stocks and risk-free securities. According to the gamesmanship hypothesis, the high returns on risky securities (particularly smaller companies) around the turn of the year are caused by systematic shifts in the portfolio holdings of professional portfolio managers who rebalance their portfolios to affect performance-based remuneration. Institutional investors are net buyers of risky securities around the turn of the year when they are less concerned about including well-known, low risk or risk-free securities in their portfolios or they are trying to outperform benchmarks. Later on in the year, portfolio managers (as they "window dress" or rebalance their portfolios) divest from lesser-known, risky, or poorly performing stocks and replace them with well known and less risky (generally larger) stocks with solid recent performance or risk-free securities, such as government bonds. The excess demand for risky securities at the turn of the year bids the prices of these securities up. The opposite happens later on in the year. Government bonds and safer, larger, well known stocks are bid up, whereas risky, smaller, obscure, less known stocks are bid down. As a result, we would expect to find seasonality not only in risky securities, but also in low risk (the "bond-like" stocks as per footnote #4)) and risk-free securities, as portfolio managers rebalance their portfolios throughout the year.[8]

The effect of combining "window dressing" and performance-based remuneration-motivated rebalancing in conjunction with arbitrage that may be taking place by those investors not bound by the restrictions or conflicts portfolio managers are facing may actually spread the seasonal strength of stocks over a number of months surrounding the turn of the year. That is, gamesmanship should not take place all at once in any given month, but it should be spread around the turn of the year and portfolio rebalancing may not happen all at once at that time, but also spread around the turn of the year, namely, in the first and last few months of the year. Such portfolio rebalancing should not only impact risky stocks, but also government bonds consistent with the gamesmanship hypothesis. As a result, we should expect seasonal strength (weakness) to be spread over a number of months around the turn of the year, namely from November to April for risky (risk-free) securities and reversal from May to October.[9]

Consequently, the following hypothesis will be tested along these lines:

H_0: There is no semi-annual seasonal pattern in the excess returns of financial securities examined in this paper, namely, small cap stocks, large cap stocks and risk-free bonds.

Based on the above discussion, we should expect to reject this hypothesis.

III. DATA AND METHODOLOGY

Data from January 1957 to December 2003 are obtained from the Canadian Financial Markets Research Centre (CFMRC) data base.[10] This data base includes, among other things, data on stock prices per share, shares outstanding and stock (total) returns, as well as rates of return on indexes of long-term government of Canada bonds (over 10 years) and 91-day Treasury bills.

Form this data base, our proxies for lesser know, riskier (i.e., small cap), and well known, safer (i.e., large cap) stocks are obtained as follows. At the beginning of every year, starting in 1957, firms are ranked based on market value (i.e., price per share times shares outstanding) from low to high and the ranked firms are divided into four groups of equal size. This process is repeated for each year of our sample. Membership in a quartile changes each year as market values change from year to year. Inclusion in a quartile depends on a stock's market value in relation to other stocks' market values. Because market values change over time, an arbitrary measure across time for all stocks in our sample would be inappropriate. Quartile-1 (Q1) is the small market value quartile or our proxy for lesser known, riskier, firms, while Quartile-4 (Q4) is the large market value quartile or our proxy for well known, safer, stocks. A cross-section, time-series of non-overlapping monthly returns are obtained for Q1 stocks and Q4 stocks from 1957 to 2003 and sub-periods. A time-series of equally weighted mean monthly returns for each quartile are also derived (La Porta, Lakonishok, Shleifer and Vishny (1997)). Over our sample period, there are 2221 different companies in the small cap quartile and 797 different companies in the large cap quartile. There are 65,114 firm-month observations in each quartile. The mean (median) market value for the small cap quartile over the whole sample period is $144,369,000 ($105,802,200). On the other hand, the mean (median) market value for the large cap quartile over the whole sample period is $22,115,022,550 ($6,623,437,500).

The 91-day T-bill return is defined as the return on a 91 day T-bill purchased at the end of last month and sold at the end of the current month. The long-term government of Canada (GOC) bond return is defined as the return on a long term GOC bond with an approximate term to maturity of 17 years purchased at the end of last month and sold at the end of the current month. Over our sample period, there are 564 monthly observations for T-bills and GOC bonds. More on the descriptions of these series and their construction can be found in Hatch and White (1988).

To test for seasonality in the excess returns of Canadian financial securities in relation to our H_0 hypothesis, the following cross-sectional, time-series dummy Generalized Method of Moments (GMM) regressions are run to provide significance tests, as diagnostic tests showed the presence of heteroskedasticity and autocorrelation in our data:[1, 2]

$$R_{st} = a_0 + a_1 D_{st} + e_{st} \qquad (1)$$

where, R_{st} is the semi-annual (November-April and May-October) excess return (on a monthly basis) of the small cap stocks or the large cap stocks or the government of Canada bonds over the T-bills, or from each other. D_{st} is a dummy variable that is equal to 1 if the current semi-annual period is May to October and equal to zero otherwise. This model identifies the semi-annual period in which stock or government of Canada bond excess returns are unusually high. It tests whether stock or government of Canada bond excess returns in May to October are different from the base semi-annual period, in this study November to April. The intercept a_0 indicates the

average excess return of stocks or government of Canada bonds in our sample for the semi-annual period of November to April. Coefficient a_1 represent the average difference in excess returns between November to April and May to October.

IV. EMPIRACAL RESULTS ON THE SEASONALITY OF EXCESS RETURNS OF FINANCIAL SECURITIES

IV.1. Summary Statistics: Semi-Annual Stock and Government Bond Returns

Table 1 reports the summary statistics of the semi-annual (on a monthly basis) raw returns of the small cap stocks (Q1) and large cap stocks (Q4), as well as the raw returns of the government of Canada bonds (GOC) and T-bills (TB) over 1957-2003 and sub-periods. We observe that November to April tends to be a strong semi-annual period for stock returns in 1957-2003 and sub-periods. In fact, on average, almost all the annual return of the small and large cap stocks examined in this paper is realized in November-April. May to October, on the other hand, tends to be a strong semi-annual period for government of Canada bond returns, driven, however, by the second sub-period of our sample, for reasons which will be explained later on. While small stock returns are higher than large stock returns in the November-April period, there seems to be a reversal in the mean return performance in the October-May period.

IV.2. Semi-Annual Stock and Government Bond Excess Return Seasonality

To test for the semi-annual seasonality in excess returns of the financial securities examined in this paper and hypothesis H_0, we next run the dummy GMM regressions discussed earlier.[13]

Table 2 reports the results from running regression (1). There is a strong, statistically significant, November-April semi-annual seasonal pattern in stock excess returns in Canada.[14] The inverse semi-annual seasonality between stocks and government of Canada bonds is quite apparent. Stocks outperform the government of Canada bonds in the November-April period and underperform them in the May to October period. The underperformance, however, is driven primarily by the second sub-period. Changes that took place in the late 1970s and early 1980s in the contact of monetary policy by the US Fed and the Bank of Canada and, especially, a dramatic increase in the liquidity of the Canadian government bond market helped induce a more severe portfolio rebalancing in and out of government securities by institutional investors in the 1981-2003 sub-period. [15] Finally, small cap stocks tend to outperform large cap stocks in the November-April period. This outperformance, however, is reversed in the May-October period. The evidence from Table 2 rejects H_0. It is also consistent with the predictions of the gamesmanship hypothesis.

The paper's findings have important implications for investors. Had investors invested consistently in risky securities (i.e., gone long in small cap stocks) in the November-April semi-annual period and gotten out of risky securities altogether in the May-October semi-annual period and, over that period, invested instead heavily (and exclusively) in government of Canada bonds, they would have produced an average annual rate of return of 21% over the last 47 years (see Table 1, Panel A). The corresponding performance for the 1981-2003 sub-period would have been 24% (see Table 1, Panel C). [16]

The findings also have implications for ongoing research on the possible drivers of the return seasonality in financial securities. The seasonality in large stock and government of Canada bond excess returns is not consistent with tax-loss selling (Tinic, Barone-Adesi and West (1987)).

Moreover, lack of (consistent with the story) seasonality in government of Canada bond returns in 1957-1980, when there is strong seasonality in 1981-2003, is inconsistent with the weather related explanation of seasonality in financial securities (see Kamstra, Kramer and Levi (2003)).

IV.3. Robustness Tests

A. Is the Semi-Annual Seasonality Driven by Any Particular Month/Year?

Table 3 reports the mean monthly raw returns of the small cap and large cap stocks, as well as of the government of Canada bonds and T-bills over 1957-2003 and sub-periods. We see that both small and large cap stocks show high mean returns in the month of January, particularly the small cap stocks. Stock returns for both sub-periods exhibit similar behaviour, although the strength of January has weakened for both cap stocks in the second sub-period, but more so for the large cap stocks. In addition to January, November and December also show above average returns. [17] The government of Canada bonds, on the other hand, experience strong returns only in the August to December period. While the seasonality in the small and large cap stock returns is consistent throughout our sample, the government of Canada bond seasonal strength is driven primarily by the second sub-period of our sample.

As the market crash of 1987 (October) and the Long Term Capital Management debacle of 1998 (August) both happened in the second sub-period of our sample and in light of the first sub-period's similar weakness in stock returns in the May to October period relative to November-April, there does not seem to be evidence in this paper that the Canadian semi-annual seasonality of stock returns is driven by these two events. Moreover, January is not the only month with seasonal strength in stock returns; November and December share with January the title of the strongest months of the year, especially for the large cap stocks. In fact, the strength of the November-December seasonal in stock returns has intensified over time. Hence, there is no evidence that the semi-annual effect is driven solely by the January effect; it is rather attributed to the strength of stock returns in a number of months around the turn of the year.

To obtain a robust picture of the seasonality in the monthly excess returns of the financial securities examined in this paper and their possible contribution to the semi-annual effect, we next examine the difference in excess returns between January and the rest of the months of the year by means of the following cross-sectional time-series dummy GMM regressions (see footnote #12):

$$R_{mt} = a_0 + \sum_{j=2}^{12} a_j D_{mt}^{j} + e_{mt} \qquad (2)$$

where, R_{mt} is the monthly excess return of the small cap stocks or the large cap stocks or the government of Canada bonds over T-bills in month t, or from each other. D^{j}_{mt} is a dummy variable that is equal to 1 if the current month is month j and equal to zero otherwise. This model tests whether stock or government of Canada bond excess returns in a given month (j=2 to 12) are different from a base month, which here is January. The intercept a_0 indicates the average excess return of stocks or government of Canada bonds for the month of January. The rest of the coefficients (a_2 to a_{12}) represent the average difference in excess returns between January and each of the other months of the year.

Table 4 reports the results from regression (2). We observe a strong, statistically significant, seasonal behaviour in the monthly excess returns of small cap from large cap stocks and of small

cap stocks (or large cap stocks) from government of Canada bonds (or T-bills). While stocks seem to do better in November, December and January and at the beginning of the year, government of Canada bonds and T-bills are outperforming both cap stocks in the August to October period. This behaviour is particularly robust in the second sub-period of our sample. Moreover, our proxy for low risk, safe, larger stocks (i.e., the large cap stocks) shows better (statistically significant) performance in the July to December period than the small cap stocks (see Table 4, Q1-Q4). The July-December performance of large cap stocks is particularly strong in the second sub-period. Similar to previous evidence, the stock market strength is distributed over a number of months around the turn of the year, and is not only concentrated in the month of January. [18]

The evidence from this section too is consistent with the predictions of gamesmanship hypothesis and provides additional support for the effect of portfolio rebalancing on security returns and the "Sell in May and Go Away" phenomenon.

B. Is it Possible That the Strength in Stock Returns in November-April is Driven by a Few Outliers?

Is it possible that the strength in stock returns in November-April is driven by a few outliers and, as a result, this effect is not as pervasive as the mean and median figures indicate? Table 6 reports the number of positive and negative stock and government bond returns in the November to April period for 1957-2003 and sub-periods. The small cap stocks experienced a positive return in the November-April period in 38 out of the 47 years of our sample and a negative return only in 9 years. Out of the 9 negative return years, 7 years, namely, 1960, 1970, 1973, 1974, 1982, 1990 and 2000, were recession years. [19] That is, if we exclude recessions, the November to April period has been dominated by positive returns. By way of comparison, small cap stock returns in the May to October period were negative in 18 out of the 47 years and only one of these years was a recession year. Figures are similar for the large cap stocks.

Most of the positive small cap stock (monthly average) returns (28 out of 38) in the November to April period exceeded 2% (none over 7%), while none of the negative returns were lower than -3.2%. At the same time, 15 out of 29 positive May-October period returns exceeded 2%, while 6 out of 18 negative May-October period returns were lower than -3% (none lower than -7%). These findings indicate that the observed seasonality is not driven by a few extremely positive November-April period returns or a few extremely negative May-October period returns. The government of Canada bonds had many more negative November to April return periods than the stocks, and mostly outside recessions. Finally, no one semi-annual period dominates the overall period findings. Positive and negative November to April periods are split almost equally between sub-periods.

C. The Seasonality of the Flow of Funds in Stocks and Government of Canada Bonds

If there is a seasonal pattern in institutional investors' portfolio rebalancing, which affects stock and government bond prices and returns, we should be able to observe seasonality in the flow of funds in stocks and government of Canada bonds throughout the year. This is because the supply of stocks and government bonds is fairly stable in the short-term, and, as a result, any seasonal change in the demand for funds relative to the supply of funds should affect the seasonal behaviour of security prices and returns. Seasonality in the (net) amount of funds invested in stocks and government of Canada bonds is consistent with the theoretical model of professional portfolio manager asset allocation and leisure consumption developed by Athanassakos and Schnabel (1994). Athanassakos and Schnabel (1994) show that in optimizing the trade off

between achieving acceptable portfolio performance and consuming leisure, portfolio managers will choose portfolios which involve larger positions in stocks early in the year, compared with later on, and vice-versa for risk-free securities.

C.1. Data

To examine the seasonality in stock and government bond fund flows in Canada and substantiate the prior return-based tests (evidence) of the gamesmanship hypothesis, we will make use of the flow of funds data, which are obtained from CANSIM II Table 3780001 of the CANSIM data base of Statistics Canada. The flow of funds data (i.e., net changes in outstanding balances) are widely disaggregated both by sector in the economy and financial instrument and provide one of the few sources of comprehensive and detailed data on the sources and uses of funds. These data are available quarterly from 1961:Q1 to 2005:Q3. They are not seasonally adjusted. From this data base, we extract the aggregate fund flows in stocks (V33078) and government of Canada bonds (V33091). Prior to the 1980s, the Canadian government bond market was extremely illiquid (see footnote #15). At the same time, prior to the 1980s, the Canadian flow of funds data suffered from many shortcomings, such as weak survey coverage, survey questionnaires which were not sufficiently detailed to meet the requirements of the flow of funds accounts and a lack of adequately documented records (Athanassakos (1988)). As a result, this study examines the seasonality of stock and government bond flow of funds data over the 1981:Q1-2005:Q3 period, which coincides with the second sub-period of the study.

C.2. Empirical Results

(i). Summary Statistics

Table 6 reports the summary statistics for the raw stock and government of Canada bond quarterly flow of funds data for the period 1981:Q1-2005:Q3, overall and by quarter. For stocks, the strongest quarter of the year is quarter one, while for government of Canada bonds, the strongest quarter of the year is quarter four. It is interesting to note that while the fund flows in stocks in quarters 2 to 4 are below those of quarter 1, there are still positive fund flows into the stock market in these quarters.[20] As discussed in footnote #17, it is possible that some arbitrage is taking place or some risk taking behaviour is followed by "desperate" institutional investors who have lagged their benchmarks and are trying to catch up by investing heavily in stocks, especially risky ones.

(ii). Regression Analysis

To formally examine the seasonality in the excess fund flows in stocks (over government of Canada bonds), we run the following time-series dummy GMM regression:

$$F_{qt} = a_0 + \sum_{j=2}^{4} a_j D_{qt}^{j} + e_{qt} \qquad (3)$$

In this regression, the dependent variable is now the quarterly excess fund flows in stocks (over government of Canada bonds). The seasonal dummy variable takes on the value of 1 if current quarter is quarter j and zero otherwise. Similar to previous interpretations, this model tests whether the difference between stock and government bond fund flows in a given quarter (j=2 to 4) is different from a base quarter, in this case quarter 1. The intercept a_0 indicates the average excess fund flows in stocks over government of Canada bonds in the first quarter. The rest of the

coefficients represent the average difference in the excess of stock over government bond fund flows between quarter 1 and each of the other quarters.

The regression coefficients from running regression (3) are reported in Table 7. Consistent with Table 6, the opposite seasonality of fund flows in stocks and government bonds is quite apparent and mirrors that of the excess stock returns. Excess fund flows in stocks are strong in the first quarter and weaken throughout the year. Quarter 4 excess fund flows in stocks are significantly lower than quarter 1 at the 1% level of significance. This section's findings are consistent with the behaviour of stock and government bond returns and provide further support for the gamesmanship hypothesis.

V. CONCLUSIONS AND INTERPRETATION OF FINDINGS

In this paper, for the period 1957-2003 and sub-periods, we examined whether seasonality was present (and persistent) in the excess returns not only of risky securities, but also of risk-free securities by looking at Canadian stock and government bond data.

Consistent with the findings of Bouman and Jacobsen (2002), this paper provided support for the expression "Sell in May and Go Away", as the average performance of risky securities was higher in the November to April period than the May to October period.[21] The opposite was true for risk-free bonds. Moreover, riskier stocks (i.e., small stocks) tended to outperform less risky stocks (i.e., large stocks) in the November to April period and underperformed them in the May to October period. The findings were robust and not driven by outliers or any particular month/year. Both of this study's sub-periods exhibited seasonality consistent with this phenomenon, which was pervasive. The evidence was consistent with the gamesmanship hypothesis.

This study examined both the seasonal behavior of stock and government of Canada bond returns, using more robust tests of significance. It also examined the seasonal behavior of the aggregate fund flows in stocks and government bonds and found them to mirror the seasonality in the returns of stocks and government bonds. As the supply of stocks and government bonds is fairly stable in the short-term, the seasonal change in the demand for funds relative to the supply of funds affected the seasonality in security prices and returns in a way consistent with the gamesmanship hypothesis.

Moreover, the paper provided evidence that had investors invested consistently in risky securities in November to April for the last 47 years and rebalanced their portfolios out of risky securities and into government bonds or T-bills for the remaining annual period, they would have outperformed the market by a significant margin.

The paper's findings have implications for ongoing research on the drivers of the return seasonality in financial securities. The seasonality in large stock and government of Canada bond excess returns evident in this paper is not consistent with tax-loss selling. Moreover, lack of (consistent with the story) seasonality in government bond returns in 1957-1980, when there is strong seasonality in 1981-2003, is also inconsistent with the weather related explanation of seasonality in financial securities.

This study's findings will be quite useful to individual investors. This is of particular importance in light of fundamental changes that are taking place in the retirement planning industry now requiring working adults to take personal responsibility for their own financial well being in

retirement. Understanding the seasonal behavior of financial markets and the inefficiencies bestowed upon them by institutional factors will help investors secure higher returns and better retirement. Additionally, the paper's findings will be useful to academics modeling investor behavior and the demand for stocks.

Table 1 – Summary Statistics of Semi-Annual (Monthly) Raw Returns of the Small Cap (Q1) and Large Cap (Q4) Stocks, Government of Canada Bonds (GOC) and T-Bills (TB) for 1957-2003 and Sub-Periods

The Table calculates and reports the summary statistics of a time series of semi-annual returns for Q1, Q4, GOC and TB for total sample and sub-periods.

Panel A: 1957-2003

	Nov – Apr				May – Oct			
	Mean	Median	Min	Max	Mean	Median	Min	Max
Q1	0.0270	0.0302	-0.0316	0.0700	0.0070	0.0098	-0.0662	0.0878
Q4	0.0221	0.0228	-0.0212	0.0550	0.0077	0.0069	-0.0313	0.0590
GOC	0.0057	0.0034	-0.0093	0.0292	0.0072	0.0079	-0.0137	0.0382
TB	0.0055	0.0053	0.0022	0.0142	0.0057	0.0053	-0.0009	0.0151

Panel B: 1957-1980

	Nov – Apr				May – Oct			
	Mean	Median	Min	Max	Mean	Median	Min	Max
Q1	0.0268	0.0312	-0.0316	0.0700	0.0068	0.0068	-0.0421	0.0593
Q4	0.0203	0.0187	-0.0212	0.0516	0.0068	0.0050	-0.0313	0.0453
GOC	0.0040	0.0031	-0.0037	0.0264	0.0022	0.0031	-0.0111	0.0112
TB	0.0046	0.0038	0.0022	0.0093	0.0046	0.0041	0.0009	0.0100

Panel C: 1981-2003

	Nov – Apr				May – Oct			
	Mean	Median	Min	Max	Mean	Median	Min	Max
Q1	0.0271	0.0287	-0.0314	0.0692	0.0073	0.0133	-0.0662	0.0878
Q4	0.0240	0.0262	-0.0083	0.0549	0.0090	0.0102	-0.0290	0.0590
GOC	0.0080	0.0051	-0.0093	0.0292	0.0135	0.0145	-0.0137	0.0382
TB	0.0069	0.0070	0.0022	0.0142	0.0072	0.0070	-0.0024	0.0151

Table 2 – Average Semi-Annual (Monthly) Excess Returns for Small Cap (Q1) and Large Cap (Q4) Stocks and Government of Canada (GOC) Long Term Bonds for the six month period of November-April (and Differences from November-April) for 1957-2003 and Sub-Periods

This Table's results correspond to the following cross-sectional time-series dummy GMM regressions:

$$R_{st} = a_0 + a_1 D_{st} + e_{st} \qquad (1)$$

where, R_{st} is the semi-annual (Nov-April and May-Oct) excess return (on a monthly basis) of the small cap or the large cap or the government of Canada bonds over the T-bills, or from each other. D_{st} is a dummy variable that is equal to 1 if the current semi-annual period is May to October and equal to zero otherwise. This model identifies the semi-annual period in which stock or government of Canada bond excess returns are unusually high. It tests whether stock or government of Canada bond excess returns in May to October are different from the base semi-annual period, in this study November to April. The intercept a_0 indicates the average excess return of stocks or government of Canada bonds for the semi-annual period of November to April. Coefficient a_1 represent the average difference in excess returns between November to April and May to October. There are 65,114 firm-month observations in the cross sectional time-series tests for the 1957-2003 period. To test the seasonality of the government of Canada bond excess returns, we employ a time-series GMM regression. In this case, 564 monthly observations are used for 1957-2003. TB stands for T-bills. F stands for F-statistic. T-statistics are in brackets. ** stands for statistical significance at the 1% level, and * for statistical significance at the 5% level.

Panel A: 1957-2003

	Nov-April	May-Oct
Q1-Q4 F=9.50**	.006** (3.57)	-.009** (2.93)
Q1-GOG F=121**	.016** (9.99)	-.031** (9.81)
Q1-TB F=60**	.021** (12.64)	-.021** (7.07)
Q4-GOC F=369**	.013** (14.56)	-.024** (14.45)
Q4-TB F=150**	.018** (20.11)	-.015** (9.72)
GOC-TB F=1	.000 (.20)	.002 (.76)

Panel B: 1957-1980

	Nov-April	May-Oct
Q1-Q4 F=19**	.008** (4.49)	-.009** (3.76)
Q1-GOG F=108**	.020** (10.13)	-.020** (7.34)
Q1-TB F=120**	.022** (11.76)	-.021** (8.09)
Q4-GOC F=107**	.014** (10.45)	-.012** (6.22)
Q4-TB F=152**	.017** (13.23)	-.014** (7.91)
GOC-TB F=1	-.001 (.29)	-.002 (.76)

Panel C: 1981-2003

	Nov-April	May-Oct
Q1-Q4 F=3*	.004* (1.98)	-.009* (1.96)
Q1-GOG F=70**	.014** (5.87)	-.038** (7.83)
Q1-TB F=24**	.018** (8.09)	-.022** (4.63)
Q4-GOC F=275**	.013* (11.18)	-.032** (13.64)
Q4-TB F=71**	.018* (16.24)	-.016** (7.21)
GOC-TB F=1	.001 (.48)	.005 (1.43)

Table 3 – Mean Monthly Raw Returns of the Small Cap (Q1) and Large Cap (Q4) Stocks, Government of Canada Bonds (GOC) and T-Bills (TB) for 1957-2003 and Sub-Periods

The Table calculates and reports the means of a time series of monthly returns for Q1, Q4, GOC and TB for the total sample and sub-periods.

Panel A: 1957-2003

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Q1	0.0586	0.0218	0.0214	0.0143	0.0129	0.0113	0.0098	0.0115	0.0029	-0.0074	0.0171	0.0316
Q4	0.0323	0.0137	0.0172	0.0155	0.0149	0.0040	0.0138	0.0121	-0.0022	0.0036	0.0216	0.0321
GOC	0.0053	0.0028	0.0000	0.0034	0.0070	0.0042	-0.0006	0.0108	0.0048	0.0170	0.0155	0.0087
TB	0.0058	0.0054	0.0057	0.0056	0.0059	0.0055	0.0056	0.0058	0.0055	0.0060	0.0056	0.0055

Panel B: 1957-1980

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Q1	0.0729	0.0228	0.0128	0.0082	0.0054	0.0061	0.0172	0.0046	0.0127	-0.0068	0.0200	0.0301
Q4	0.0416	0.0079	0.0111	0.0115	0.0051	0.0066	0.0181	0.0094	0.0006	-0.0016	0.0223	0.0275
GOC	0.0043	0.0007	-0.0006	0.0055	0.0011	0.0028	-0.0034	0.0030	0.0030	0.0071	0.0083	0.0060
TB	0.0047	0.0045	0.0046	0.0044	0.0049	0.0045	0.0045	0.0046	0.0044	0.0046	0.0047	0.0046

Panel C: 1981-2003

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Q1	0.0436	0.0208	0.0303	0.0208	0.0208	0.0167	0.0021	0.0188	-0.0074	-0.0079	0.0140	0.0332
Q4	0.0225	0.0198	0.0236	0.0197	0.0250	0.0013	0.0093	0.0149	-0.0052	0.0090	0.0208	0.0369
GOC	0.0065	0.0053	0.0009	0.0007	0.0146	0.0059	0.0030	0.0207	0.0070	0.0295	0.0245	0.0120
TB	0.0072	0.0066	0.0070	0.0070	0.0071	0.0069	0.0071	0.0073	0.0070	0.0077	0.0067	0.0067

Table 4 – Average Monthly Excess Returns for Small Cap (Q1) and Large Cap (Q4) Stocks and Government of Canada (GOC) Long Term Bonds for the Month of January (and Differences from January) for 1957-2003 and Sub-Periods

This Table's results correspond to the following cross-sectional time-series dummy GMM regressions:

$$R_{mt} = a_0 + \sum_{j=2}^{12} a_j D_{mt}^{j} + e_{mt} \qquad (2)$$

where, R_{mt} is the total monthly excess return of small cap stocks or large cap stocks or the government of Canada bonds from each other and T-bills in month t, D^{j}_{mt} is a dummy variable that is equal to 1 if the current month is month j and equal to zero otherwise. This model identifies the months in which stock excess returns are unusually high. It tests whether stock or government of Canada bond excess returns in a given month (j=2 to 12) are different from a base month, in this study January. The intercept a_0 indicates the average excess return of stocks or government of Canada bonds in our sample for the month of January. The rest of the coefficients represent the average difference in excess returns between January and each of the other months. There are 65,114 firm-month observations in the cross sectional time-series tests for the1957-2003 period. To test the seasonality of the government of Canada bond excess returns, we employ a time-series GMM regression. In this case, 564 monthly observations are used for 1957-2003. TB stands for T-bills. F stands for F-statistic. T-statistics are in brackets. ** stands for statistical significance at the 1% level, and * for statistical significance at the 5% level.

Panel A: 1957-2003

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Q1-Q4 F=5**	.030** (6.86)	-.022** (3.74)	-.023** (4.33)	-.032** (5.30)	-.031** (5.71)	-.023** (1.83)	-.037** (6.90)	-.032** (5.39)	-.029** (3.54)	-.046** (8.92)	-.035** (6.48)	-.031** (5.30)
Q1-GOC F=19**	.047** (10.61)	-.030** (5.45)	-.021* (3.70)	-.034** (5.21)	-.040** (7.28)	-.037** (2.70)	-.034** (5.94)	-.053** (8.50)	-.050** (9.10)	-.086** (14.66)	-.052** (8.98)	-.024* (3.93)
Q1-TB F=13**	.046** (10.84)	-.034** (6.45)	-.027** (4.88)	-.036** (5.81)	-.037** (6.79)	-.037** (2.67)	-.041** (7.27)	-.047** (7.50)	-.051** (9.22)	-.073** (13.07)	-.039* (7.11)	-.019 (3.29)
Q4-GOC F=40**	.028** (9.75)	-.013** (3.81)	-.007 (1.88)	-.016** (4.63)	-.022** (6.58)	-.027** (8.02)	-.011** (3.17)	-.031** (8.83)	-.029** (4.50)	-.048** (11.39)	-.025** (6.89)	.005 (1.70)
Q4-TB F=23**	.028** (9.53)	-.016** (4.80)	-.013** (3.65)	-.019** (5.55)	-.018** (5.27)	-.026** (7.73)	-.018** (5.15)	-.025** (6.57)	-.029** (4.48)	-.034** (8.48)	-.013** (3.43)	.001 (.43)
GOC-TB F=2*	-.001 (.23)	-.001 (.04)	-.005 (1.19)	-.001 (.19)	.003 (.64)	-.001 (.03)	-.006 (.98)	.007 (1.27)	.001 (.13)	.011* (1.99)	.010 (1.68)	.003 (.80)

Panel B: 1957-1980

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Q1-Q4 F=12**	.036** (7.56)	-.023** (3.68)	-.034** (5.60)	-.043** (6.91)	-.033** (5.51)	-.035** (5.87)	-.037** (6.05)	-.044** (7.31)	-.030** (4.51)	-.043** (7.17)	-.040** (6.21)	-.027** (4.34)
Q1-GOC F=45**	.071** (12.53)	-.042** (5.96)	-.060** (8.60)	-.075** (10.43)	-.066** (9.68)	-.061** (8.83)	-.049* (6.99)	-.070** (9.93)	-.065** (8.93)	-.086** (12.67)	-.064** (8.55)	-.040** (5.52)
Q1-TB F=43**	.069** (12.49)	-.046** (6.85)	-.065** (9.46)	-.072** (10.01)	-.068** (10.00)	-.061** (8.98)	-.056** (8.16)	-.070** (10.09)	-.065** (9.17)	-.082** (12.26)	-.057** (7.77)	-.036** (5.21)
Q4-GOC F=51**	.043** (11.17)	-.028** (5.86)	-.035** (7.26)	-.040** (8.44)	-.041** (9.00)	-.033** (6.91)	-.020** (4.08)	-.034** (7.13)	-.044** (8.82)	-.053** (10.89)	-.030** (5.68)	-.022** (4.62)
Q4-TB F=51**	.041** (10.61)	-.032** (6.94)	-.040** (8.06)	-.036** (7.66)	-.042** (8.91)	-.033** (6.85)	-.027** (5.86)	-.034** (7.00)	-.045** (9.23)	-.050** (9.96)	-.023** (4.46)	-.018** (3.83)
GOC-TB F=1	-.001 (.08)	-.003 (.58)	-.005 (.88)	.001 (.19)	-.003 (.58)	-.001 (.24)	-.008 (1.31)	-.001 (.23)	-.001 (.19)	.003 (.41)	.004 (.69)	.002 (.32)

Panel C: 1981-2003

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Q1-Q4 F=3**	.026** (4.29)	-.022** (2.59)	-.018* (2.30)	-.025** (2.95)	-.029** (3.87)	-.016 (.83)	-.037** (4.92)	-.025** (2.92)	-.028* (2.35)	-.049** (6.65)	-.033** (4.32)	-.033** (3.99)
Q1-GOC F=70**	.030** (5.07)	-.022** (2.90)	.006 (.82)	-.005 (.54)	-.022** (2.86)	-.021 (.91)	-.024** (3.00)	-.041** (4.57)	-.040** (5.40)	-.087** (10.55)	-.043** (5.56)	-.013 (1.48)
Q1-TB F=24**	.030** (5.28)	-.025** (3.51)	-.001 (.04)	-.012 (1.33)	-.015* (1.99)	-.020 (.87)	-.030** (3.88)	-.030** (3.35)	-.040** (5.40)	-.066** (8.56)	-.027** (3.65)	-.007 (1.00)
Q4-GOC F=275**	.019** (4.87)	-.004 (.85)	.011* (2.50)	-.001 (.15)	-.010* (2.23)	-.023** (5.37)	-.006 (1.27)	-.030** (6.37)	-.020** (1.97)	-.045** (7.71)	-.022** (4.80)	.004 (1.29)
Q4-TB F=71**	.019** (4.94)	-.006 (1.42)	.004 (.93)	-.008 (1.78)	.003 (.64)	-.022** (5.06)	-.011** (2.57)	-.018** (3.71)	-.019 (1.93)	-.024** (4.41)	.006 (1.26)	.009* (2.01)
GOC-TB F=2*	-.001 (.26)	.003 (.41)	-.006 (.85)	-.003 (.46)	.010 (1.49)	.002 (.23)	-.003 (.37)	.015 (1.83)	.003 (.30)	.021** (2.54)	.016 (1.65)	.005 (.78)

Table 5 – Number of years with positive and negative returns for the November - April period for Small Cap (Q1) and Large Cap (Q4) stocks and government of Canada bonds (GOC) for 1957-2003 and sub-periods

Panel A: 1957-2003				
	Mean		Median	
	Positive	Negative	Positive	Negative
Small Cap (Q1)	38	9	36	11
Recession years	-	7	-	7
Large Cap (Q4)	41	6	41	6
Recession years	-	5	-	5
GOC	34	13	36	11
Recession years	-	2	-	1

Panel B: 1957-1980

	Mean		Median	
	Positive	Negative	Positive	Negative
Small Cap (Q1)	19	4	20	3
Recession years	-	4	-	3
Large Cap (Q4)	21	3	21	3
Recession years	-	3	-	3
GOC	17	7	20	4
Recession years	-	1	-	0

Panel C: 1981-2003

	Mean		Median	
	Positive	Negative	Positive	Negative
Small Cap (Q1)	19	5	16	8
Recession years	-	3	-	4
Large Cap (Q4)	20	3	20	3
Recession years	-	2	-	2
GOC	17	6	16	7
Recession years	-	1	-	1

Table 6 – Summary Statistics of Quarterly Flow of Funds ($Millions) in Stocks and Government of Canada Bonds for the Period 1981:Q1 to 2005:Q3

	Mean	Median	Min	Max
Stock Flows				
Overall	7662	4965	-6332	31698
Quarter1	10402	7459	-499	31698
Quarter2	6822	5250	-6332	27348
Quarter3	6087	4137	-1517	20969
Quarter4	7325	3746	-5319	26587
Government Bond Flows				
Overall	2336	2043	-14115	16286
Quarter1	244	519	-9610	6449
Quarter2	2052	1595	-6028	10106
Quarter3	856	1737	-14115	11336
Quarter4	6354	7393	-11851	16286

Table 7 – Average Excess Quarterly Flow of Funds ($Millions) of Stocks Less Government of Canada Bonds for the First Quarter (and Differences from the First Quarter) for 1981:Q1 to 2005:Q3

This Table's results correspond to the following time-series dummy GMM regressions:

$$F_{qt} = a_0 + \sum_{j=2}^{4} a_j D_{qt}^{j} + e_{qt} \qquad (3)$$

where, F_{qt} is the quarterly excess fund flows of stocks over government of Canada bonds, and D^{j}_{qt} is a dummy variable that takes on the value of 1 if current quarter is quarter j and zero otherwise. This model identifies the quarters in which excess fund flows in stocks over government of Canada bonds are unusually high. It tests whether the excess stock over government bond fund flows in a given quarter (j=2 to 4) are different from a base quarter, in this case quarter 1. The intercept a_0 indicates the average excess stock over government bond fund flows in the first quarter. The rest of the coefficients represent the average difference in excess stock over government bond fund flows between quarter 1 and each of the other quarters. T-statistics are in brackets. ** stands for statistical significance at the 1% level, and * for statistical significance at the 5% level.

F-Statistic=4**	Quarter1	Quarter2	Quarter3	Quarter4
Stock Flows Less Government of Canada Bond Flows	10157 (4.00)**	-5386 (1.88)	-4926 (1.51)	-9185 (2.49)**

ENDNOTES

[1] See, for example, Luciw (2005), DeCloet (2005) and Tait (2005).

[2] It is reasonable to assume that portfolio managers, being professionals, are more disciplined and able to resist irrationalities and human psychology biases better than individual investors. However, they do have an incentive to follow self benefiting behavior.

[3] This is consistent with comments made to the media by market professionals, as the quote that follows indicates. "Going into year-end what you're going to have is some of the portfolio managers locking in some of their nice gains and not putting them at risk four weeks from year end" (Heinzl (2005)).

[4] Baker and Wurgler (2005) find that government bonds correlate strongly with "bond-like" stocks. These are large stocks, long listed stocks and stocks of profitable and dividend paying stocks. This finding is consistent with the argument made in this paper that such "bond-like" stocks and risk-free bonds should exhibit similar seasonality which is driven by the trading behavior of professional portfolio managers whose trades are motivated by self interest.

[5] Recent research trying to explain the seasonal pattern of stock returns along these lines has tended to emphasize human psychology and the impact weather variables have on investor behavior rather than the principle-agent problems arising from delegated portfolio management. These studies tend to argue that the weather influences the mood and risk taking behavior of investors, which in turn influences stock returns. Hirshleifer and Shumway (2003) hypothesize that cloudy skies lead to investor misattribution and lower returns. This argument, however, does not seem to hold much water as although the weather tends to be better during the summer months, we find lower returns during the summer. On the other hand, Kamstra, Kramer and Levi (2003) argue that bad weather is associated with more risk-aversion. There is less risk aversion in the summer, as the weather is better, and that is why we document lower returns in the summer months. Similarly, Cao and Wei (2004) link stock returns to temperature variations. The last two papers are more intuitively appealing, and can be consistent with the opposite seasonality documented between risky (generally smaller and obscure) stocks and government bonds. However, the weakest months for stock returns are September and October and the strongest months for government bond returns are October and November, which are definitely outside the summer months. In addition, as it will be shown later, the government of Canada bond return seasonality is driven by the second sub-period of our study, when the government of Canada bond market became liquid. As the weather seasonality was the same over our two sub-periods, differential government bond return seasonality can not be explained by the weather. In relation to the last two papers, Jacobsen and Marquering (2004) conclude that, "without any further evidence, the correlation between weather variables and stock returns might be spurious and the conclusion that weather affects stock returns through mood changes of investors is premature". Moreover, Kelly and Meschke (2005) show that not only is the Seasonal Affective Disorder or SAD not supported by the psychological literature, but that also "econometric specifications of the model reflect the higher returns around the turn of year, mechanically inducing statistical significance".

[6] There are distinct differences between the Canadian and US markets. It is widely believed that the Canadian historical experience is very different from that of the US, where most of studies on stock market performance are based (See Gluskin (2006)). For example, the Toronto Stock Exchange (TSX) has been dominated by natural resources and financial services stocks over our

sample period, making the TSX less diversified and more exposed to the business cycle swings than the US market. Moreover, in commodity stocks, such as natural resource stocks, if one stays invested for the long run and not try to time the market, his/her average returns will be about zero (See DeCloet (2006)). As a result active managers in Canada have beaten the index more often than their US counterparts (See Gluskin (2006)).

[7] The paper's findings could also be useful to professional portfolio managers, but as Arnott (2003) argues, unlike individuals, "liquidation of all stocks in an institutional portfolio ... is a zero tolerance decision in which a decision must succeed or else the manager is fired" (page 8). Nevertheless, professional portfolio managers can still benefit from this paper's findings by investing in riskier stocks in the November to April period and switching to less risky stocks as the year progresses.

[8] If tax loss selling causes seasonal behaviour in financial markets, as Tinic, Barone-Adesi and West (1987) have argued, we will not expect to find seasonality in government bonds, and in the returns of low risk, large, safe stocks. This is because tax loss selling is generally associated more with the behaviour of individual investors who tend to hold smaller cap stocks (see Ritter (1988)). At the same time, institutional investors tend to concentrate more on larger, safer and better known stocks, and risk-free bonds (see Blume and Friend (1986)). Thus, the stock of large, well known and low risk firms, as well as government bonds should not be subject to any buying or selling pressure for the purpose of tax-loss selling.

[9] On the question of why we chose November to April and May to October, we refer to Bouman and Jacobsen (2002) who state "While we lack a formal theory, we do at least have an old market saying to go by. In other words, we have not tried all half-year periods and have only reported the results of the best period we find".

[10] The CFMRC database starts in January 1957.

[11] For an excellent discussion of Generalized Method of Moments (GMM) Regressions, see Ferson and Harvey (1992).

[12] To test for seasonality in the government of Canada bond excess returns, we employ a time-series dummy Generalized Method of Moments regression.

[13] We also ran dummy OLS regressions. The results, not reported here, show that statistical significance was stronger for the OLS regressions.

[14] This finding is consistent with Bouman and Jacobsen (2002). They examine a number of possible explanations for this finding, such as data mining, the January Effect, risk explanations, shifts in interest rates, sector specific factors, which they all reject. Particularly with regards to the usual criticism of such studies, that of data mining, they state "While we lack a formal theory, we do at least have an old market saying to go by. In other words, we have not tried all half-year periods and have only reported the results of the best period we find". They conclude by saying "It seems that we have not yet solved this new puzzle".

[15] In the late 1970s, the Canadian government started to incur large budgetary deficits which resulted in the issuance of a large amount of government of Canada bonds to finance the deficit. This was unlike earlier periods. The increased issuance of government of Canada bonds added to the liquidity of the Canadian government bond market starting in the late 1970s. In fact, prior to the late 1970s, the Canadian government bond market was so thin that market participants were

benchmarking all bonds off a corporate bond, namely the Bell Canada Enterprises bond, which had much higher liquidity than corresponding government of Canada bonds. As a result, there would have been little scope for portfolio rebalancing by professional portfolio managers using government of Canada bonds in the 1957-1980 sub-period of our study. We would like to thank Mr. Rajiv Silgardo of Barclays Global Investors for bringing this to our attention.

[16] Not only does this strategy generate a higher return than the market portfolio, but it also encompasses lower risk as far as individual investors are concerned. In addition, this is a low transaction costs strategy as it requires entry into and exit out of the market only twice a year. Finally, for retirement savings plan accounts, such strategy would also have no immediate tax implications.

[17] November and December returns tend to also be significantly positive for the small and large cap stocks employed in this paper. It is quite possible that some arbitrage is taking place by those investors not bound by the constraints or conflicts portfolios managers face. In addition, it is possible that some risk taking behavior is followed by "desperate", so to speak, portfolio managers who have lagged their benchmarks and are trying to catch up by investing in extremely risky stocks. This behavior is not unlike the behavior of corporate finance managers who in cases of extreme financial distress are willing to forgo positive NPV projects in favor of negative NPV projects as long as these projects have extremely high risk hoping to hit the "jackpot" and escape the predicament their company and themselves are in and in so doing "go for broke", to use a gambling language (see Brealey, Myers and Allen (2006, p. 483). This is also consistent with the evidence on investment fund tournaments (Brown, Harlow and Starks (1996)).

[18] Regression (2) was also re-run with two dummy variables to control for October 1987 and August 1998. The coefficient for the October 1987 dummy was significantly negative, whereas the coefficient for the August 1998 dummy was not. The addition of these two dummies reduced somewhat the significance and size of the October and August dummy variable coefficients in regressions (2), but not significantly.

[19] The timing of recessions is obtained from www.thedowtheory.com/bear&recessions.htm, which is consistent with NBER. The US and Canadian business cycle dates are mostly identical, but we prefer to use the US business cycle dates as more effort and resources go into the timing of US business cycle dates and it is the US economy that most Canadian economists tend to focus on as the driver of the Canadian business cycles.

[20] T- and F-statistics show that mean quarterly fund flows in stocks are different from zero and from each other, respectively at traditional levels of significance. Similar statistics for the mean quarterly fund flows in government bonds show that only quarter 4 is statistically different from zero at the 1% level of significance, although the mean quarterly fund flows in government bonds are different from each other at traditional levels of significance.

[21] It has recently come to our attention that a working paper by Doeswijk (2004) attributes the "Sell in May and Go Away" finding to an optimism cycle in the stock market that repeats every year, based on the argument that analysts tend to be optimistic at the beginning of the year and become increasingly pessimistic about earnings from June onwards. While this is true, it is not inconsistent with the gamesmanship hypothesis. This is because, it is not the analysts who drive returns, but rather those who put their money where their mouth is and trade, namely professional portfolio managers. Ackert and Athanassakos (1997), for example, argue that, as portfolio managers rebalance their portfolios at the turn of the year, analysts have a greater incentive to be optimistic early in the year in order to attract new institutional business. As a result, causality runs

not from the analysts to professional portfolio managers, but the other way, although there may also be a feedback effect as professional portfolio managers may use analysts' optimistic forecasts as an excuse to invest heavily in equity markets at the beginning of the year.

REFERENCES

Ackert, L. F. and G. Athanassakos, "Prior uncertainty, analyst bias, and subsequent abnormal returns", *Journal of Financial Research* 20 (2), 1997, pp. 263-273.

Arnott, R. D., "What Risk Matters? A Call for Papers!", *Financial Analysts' Journal 59*, 2003, pp. 6-7.

Athanassakos, G., "New Tests of Competing Theories of Interest rates and the Term Structure", Unpublished PhD Thesis, York University, Toronto, 1988.

Athanassakos, G. and J. Schnabel, "Professional Portfolio Managers and the January Effect: Theory and Evidence", *Review of Financial Economics* 4, 1994, pp. 79-91.

Baker, M. and J. Wurgler, "Government Bonds and the Cross Section of Stock Returns", Working Paper, Harvard University, 2005.

Blume, M. and I. Friend, "Recent and Prospective Trends in Institutional Ownership and Trading of Exchange and OTC Stocks", Working Paper, University of Pennsylvania, 1986.

Bouman, S. and B. Jacobsen, "The Halloween Indicator, 'Sell in May and Go Away': Another Puzzle", *American Economic Review 92*, 2002, pp. 1618-1635.

Brandes, C. H., *Value Investing Today*, Third Edition, Mc Graw-Hill, NY, 2004.

Brown, K. C., W. V. Harlow and L. Starks, "Of Tournaments and Temptations: An Analysis of Managerial Incentives in the Mutual Fund Industry", *Journal of Finance 51*, 1996, pp. 85-110.

Brealey, R.A., S. C. Myers and F. Allen, *Principles of Corporate Finance*, 8th Edition, McGraw-Hill Irwin, New York, NY, 2006.

Cao, M. and J. Wei, "Stock Market Returns: A Note on Temperature Anomaly", *Journal of Banking and Finance 29*, 2005, pp. 1559-1573.

DeCloet, D., "Keep it Simple with Greenblatt's Magic Formula: Buy Quality and Hold on", *Globe and Mail*, February 11, 2006, p. B1.

DeCloet, D., "For Stocks, a Summer of Love", *The Globe and Mail/Report on Business*, July 21, 2005, p. B1.

Doeswijk, R., Q., "The Optimism Cycle: Sell in May", Working Paper, Institute for Research and Investment Services, The Netherlands, 2004.

Ferson, W. E and C. R. Harvey, "Seasonality and Consumption-Based Asset Pricing", *Journal of Finance 47*, 1992, pp. 511-552.

Greenwald, B. C. N., J. Kahn, P. D. Sonkin and M. Van Biema, "Value Investing: From Graham to Buffett and Beyond", Wiley Finance, John Wiley & Sons, Inc., Hoboken, N.J., 2001.

Gluskin, I., "O Canada: Timing, Luck Help in Investing on Geographical Basis", *Globe and Mail*, February 4, 2006, p. B10.

Hatch, J.E. and R.W. White, *Canadian Stocks, Bonds, Bills and Inflation: 1950-1987*, The Research Foundation of the Institute of Chartered Financial Analysts, Charlottesville, Virginia, 1988.

Haugen, R.A., *Modern Investment Theory*, Second Edition, New Jersey: Prentice-Hall, Englewood Cliffs, 1990.

Haugen, R.A. and J. Lakonishok, *The Incredible January Effect: The Stock Market's Unsolved Mystery*, Dow Jones-Irwin, Illinois, 1988.

Heinzl, J., "Despite Gains, November Goes out with a Whimper", *The Globe and Mail/Report on Business*, December 1, 2005, p. B20.

Hirshleifer, D. and T. Shumway, Good Day Sunshine: Stock Returns and the Weather", *Journal of Finance 58*, 2003, pp. 1009-1032.

Jacobsen, B. and W. Marquering, "Is it the Weather?", Working Paper, Erasmus University, 2004.

Kamstra, M, L. A. Kramer and M. D. Levi, "Winter Blues: A SAD Stock Market Cycle", *American Economic Review 93*, 2003, pp. 324-343.

Kelly, P. J. and J. F. Meschke, "Event-Induced Sentiment and Stock Returns", Working Paper, University of South Florida, 2005.

La Porta, R., J. Lakonishok, A. Schleifer, and R. W. Vishny, 1997, Good News for Value Stocks: Further Evidence on Market Efficiency, *Journal of Finance 50*, 1715-1742.

Luciw, R., "A Contrarian View on the Contrarian View", *The Globe and Mail/Report on Business*, April 26, 2005, p. B17.

Maberly, E. D., and R. M. Pierce, "Stock Market Efficiency Withstands Another Challenge: Solving the "Sell in May/Buy After Halloween" Puzzle", *Economic Journal Watch 1*, April 2004, pp. 29-46.

Ogden, J. P., "The Calendar Structure of Risk and Expected Returns on Stocks and Bonds", *Journal of Financial Economics 70*, 2003, pp. 29-67.

Ritter, J.R., "The Buying and Selling Behaviour of Individual Investors at the Turn of the Year," *The Journal of Finance* 43, July 1988, pp. 701-716.

Shleifer, A, and L. H. Summers, "The Noise Trader Approach to Finance", *Journal of Economic Perspectives 4*, 1990, pp. 19-33.

Tait, C., Take the Summer Off?", *The National Post/Financial Post*, May 4, 2005, p. FP11.

Tinic, S.M., G. Barone-Adesi, and R.R. West, "Seasonality in Canadian Stock Prices: A Test of the 'Tax-Loss-Selling Hypothesis'", *Journal of Financial and Quantitative Analysis,* 1987, pp. 51-64.