Calendar Effects in the Canadian Market

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Abstract

The aim of this paper is to examine calendar anomalies, which had been studied in great details since early 1900s on US market. We study, specifically, the day-of week (Monday) effect, the turn-of-month effect, the turn-of-year (January) effect, the pre-holiday effect, and the sell-in-May and go away (Halloween indicator) with the Canadian stock market. Several papers that studied anomalies on Canadian stocks have been identified but none of which studied every possible anomalies there is in history and documented them in one paper, and none of which has specifically studied the anomalies on Canadian stock market in recent years. Well researched papers such as Haugen and Jorion (1996) that studied the January effect on US market with data from years 1927 to 1942 and Athanasakos (1992) also studied the January effect but on Canadian market with data from years 1960 to 1989 all yielded significant calendar anomalies. Calendar anomalies – January effect was discovered in Haugen and Jorion (1996) after all these years. Dzhabarov and Ziemba (2010) comprised all the calendar anomalies on US market; hence, changes of calendar effects over time on Canadian market are of major interest in this paper .

Introduction

A consistent theme in the market efficiency literature concerns the presence of calendar anomalies in stock market returns. Capital market efficiency has been a popular topic for empirical research since long ago. All kinds of calendar anomalies in stock market return have been documented extensively in the finance literature. These anomalies have continuously been investigated, especially studies done on the US stock market. (see, e.g., Ariel (1987), Fields (1931, 1934), Banz (1981)), (also see, e.g., Cadsby (1992) and Haugen and Jorion (1996)) for recent studies. Some excellent studies have also been

performed and seasonal effects been found, in specific international markets, for example Singapore markets (Wong, Agarwal and Wong (2006)), United Kingdom markets (Paudyal and Draper (2002), and other developed countries (Gultekin and Gultekin (1983)).

French (1980) found daily returns of the S&P Composite and discovered high, consistent returns on Fridays and lower returns on Mondays. Athanassakos (1992) investigated returns on the Toronto Stock Exchange 300 (hereafter, TSE 300) and identified a quarterly seasonal behavior, in particular the monthly returns, are higher for smaller firms than larger ones in Canadian stock market. Ariel (1987) documented excess returns with data from the New York Stock Exchange (hereafter, NYSE) stocks from Center for Research in Security Prices (hereafter, CRSP) Equal- and Value-weighted Index returns spanning from 1963 to 1981. He found abnormal high returns in days surrounding the turn-of-the-month (hereafter, TOM) and during the first half (hereafter, FH) of the month.

This paper examines the profitability of different calendar effects for the period 1956-2009. Most previous researches have focused on the US stock market. The contribution of this study is to fill the gap regarding the efficiency of the Canadian stock market. Has markets become more efficient with time? i.e., Have effects disappeared in the last few years or not? This question turns out to be difficult to answer. With normal transactions costs, none of the anomalies seem to offer enormous opportunities for private investors in the case of small firms – small trading volume with high trading expenses.

The organization of the paper is as follows. The next section describes the data sources, section III through section VII documents review of the each anomaly literature with empirical results, results done with both monthly and daily stock returns on the Toronto

Stock Exchange for various periods since 1956. The last section summarizes the findings and suggest directions for future research.

Data

We focus our attention on changes in the indexes published by Canadian Financial Markets Research Center Database (hereinafter "CFMRC") , in which provides historical stock market data for common equities and non-common equities that traded on the Toronto Stock Exchange (hereinafter TSX)/ Unviersity of Western Ontario.

The S&P/TSX Composite Index is designed to measure the market activity of stocks that are listed on the Toronto Stock Exchange. It is a leading index of the Toronto Stock Exchange is based on the prices of shares that comprise more than 70% of the market capitalization of the shares listed by the Toronto Stock Exchange (TSX.) The TSX is the largest Canadian Stock Exchange, the third largest stock exchange in North America and the seventh exchange in the world.

The S&P/TSX Composite Index contains stocks of the largest companies on the Toronto Stock Exchange (TSX). The index is calculated by Standard and Poor's, and contains both common stocks and income trust units. It is equivalent to the S&P 500 market index in the US. Hence, it is employed in this paper as a representative of large cap index.

The tests are conducted with the S&P/TSX Composite Index (hereafter, Composite), S&P/TSX SmallCap Index (hereafter, SmallCap), Value- and Equal-weighted portfolios constructed by the Canadian Financial Markets Research Center (hereafter, CFMRC). Daily data are available from January 2, 1975 onwards and monthly data are available from December 1949 onwards. Hence, the monthly indexes span during the period of

January, 1956 to December, 2009, and daily indexes span during the period of January, 1977 to December, 2009.

Literature Review

There have been numerous empirical studies that have examined stock market about seasonal anomalies in the past. These studies have considered seasonal regularities related to the day of the week [Brooks and Persand (2001)], the turn of the month [Ariel (1987)], the turn of the year [Lakonishok and Smidt (1984)], sell in May and go away [Gultekin and Gultekin (1983) and Dzhabarov and Ziemba (2010)], and pre-holiday effect [Ariel (1990)]. Rozeff and Kinney (1976) found seasonal patterns in an equal-weighted index of New York Stock Exchange (NYSE) prices over the period 1904-74. The average monthly return, specifically, was about 3.5 percent, while other months averaged about 0.5 percent. The study further documented that their findings lead to conclude that January effect is primarily a small firm phenomenon since an equal-weighted index is a simple average of the prices of all firs listed on the NYSE. In addition, Banz (1981) yielded the same results – small firms earn higher returns than larger ones. Some studies extended the research to investigate the feasible exploitation on these anomalies. Hsaio and Solt (2004) argues that not only the weekend effect persists, the effect can certainly be exploited with tactical strategies to make ascending returns with risk not greater than that of the benchmark of Buy & Hold strategy.

Day-of-the-week

The day-of-the-week effect refers to the observation that stock returns are not equal across the days of the week. Typical studies done on day-of-the week effect report significant, negative returns on Monday and high, positive returns during the middle of the week. Published research for the United States and Canada finds that daily stock

market returns tend to be lower on Mondays and higher on Fridays (Dzhabarov and Ziemba (2010)). Cross (1973), for example, reports evidence of Standard & Poor's Composite Stock Index (hereafter, S&P Composite) to generate 62 percent returns on all Fridays, but only 39.5 percent on all Mondays. Extensive evidence of the day-of-the-week effect has continuously been documented in the US stock market, for example, Gibbons and Hess (1981), and Lakonishok and Smidt (1988). The day-of-the-week effect has been widely reported in other countries as well. In Singapore, Wong and Ho (1986) documented a weekly seasonal pattern of stock returns over the period 1975-1984. In contrast, daily returns in Pacific Rim countries tend o be lowest on Tuesdays (Jaffe and Westerfield (1985)). Jaffe and Westerfield shows the presence of weekend effect in many other countries besides US. More recently, Wong and Agarwal (2006) shows that the calendar anomalies in the Singapore Stock Market has disappeared. Summary statistics for the Canadian stock market, from 1977 to 2009, are presented in table 1. In table 1(a), the means, standard deviations and t-statics for Composite, Equal-weighted, and Value-weighed Indices are tabulated into seven subperiods (1977-1981, 1982-1986, 1987-1991, 1992-1996, 1997-2001, and 2007-2009.) In table 1(b), the same summary statistics are shown for S&P/TSX SmallCap Index and the index are tabulated to four subperiods (2000-2002, 2003-2005, 2006-2007, and 2007-2009.) The expected Monday returns for the overall period (1977-2009) in table 1(a) has low, negative Monday returns and high, positive Friday returns for Composite. This phenomenon seems to dissipate as time moves, e.g., the market has a 0.04 percent Monday average return and a -0.06 percent Friday average return. The t-statistics shown in table 1(a) indicate the hypothesis that Monday' expected returns were different from zeros are not conclusive. In contrast, the negative Monday returns and positive Friday returns in table 1(b) are more consistent to findings in the past studies; yet, the t-statistics indicate non-conclusive

results. The results suggest that the day-of-week effect is evidently consistent with the findings in the past. However, the t-statistics in our paper indicate that further studies and techniques could be employed to derive more definite results.

Turn-of-the-month

The turn-of-the-month effect refers to the unusually high stock returns at the turn of the month defined as the period from the last trading day of the previous month to the first three trading days of the current month. Ariel (1987) defined Turn-of-the-month (hereafter, TOM) effect by two distinct trading strategies (1) trading month that extend from the last trading day (inclusive) of each calendar month to the last trading day (exclusive) of the following calendar month, and (2) trading month that is divided evenly in half. With data span 1963 through 1981, Ariel discovered that last-half daily means are indistinguishable from zero and the mean returns for the first half of trading months significantly exceeds the mean daily return from the last half of trading months. Table 3 shows the summary statistics for the average daily returns of CFMRC Equal- and Value-weighted Indices spanning 1993 through 2009. The t-statistics for the mean daily returns from the Day_{-1} to Day_{+4} are 4.582 and 3.401 for Equal- and Value-weighted respectively. Furthermore, the cumulative returns are rather small for both indexes for Day_{+5} to Day_{+9}. For the entire period 1993-2009, the mean cumulative return from the first half of trading months significantly exceeds the mean cumulative return from the second half of trading months. Lakonishok and Smidt (1988) found US return on the turn-of-the-month trading days (the last and first three days of the month) is about eight times higher than on other trading days when the Dow Jones Industrial Average (DJIA) index from 1897-1986 was employed. Our findings are consistent with the results in both Ariel (1973) and Lakonishk and Smidt(1988).

Figure 1 shows histograms of Equal-weighted Indexes from Day_{-9} to Day_{+9} with an average of 0.20 percent. Likewise, Figure 2 is the histogram for Value-weighted Index with an average of 0.05 percent. Evidently, we discovered higher mean returns from Day_{-1} to Day_{+4} than the rest of mean returns for other days for Equal-weighted Index. In addition, Value-weighted Index has the highest return from Day_{-1} to Day_{+2}.

Figure 3 shows the histograms for S&P/TSX Composite Index's daily return from Day_{-9} to Day_{+9}, spanning from 1977 through 2009, period which is decomposed to two subperiods (1977-2007) and (2007-2009). Positive returns for Day_{-5} to Day_{-1} are consistent for both subperiods. We conclude results of the same test for S&P/TSX SmallCap Index; Figure 5 and 6 show the negative returns for Day_{-4} to Day_{-2}. Strikingly, turn-of-month-effect is not only trading days related, but it is also highly firm-size influenced.

January Effect

The January effect, also known as the turn-of-the-year effect, is a calendar effect, wherein securities displayed appreciation in value from December to January. With the exception of the 1929-1940 period, Rozeff and Kinney (1976) documented large January effect for periods for 1904 -1974 on the New York Stock Exchange. Keim (1983) later provided evidence that daily abnormal returns in January have larger means relative to the other months. He further documented that more than 26 percent of the January premium is attributable to large abnormal returns during the first week of trading in the year. Not only the effect has been intensively investigated with US market, it has been also observed in other countries: Gultekin and Gultekin (1983) found seasonal pattern in sixteen countries and discovered higher January returns in fifteen of them. Table 4 reports the results for the 53-year period 1956-2009 with a subperiod 2007-2009 when

recent financial crisis is in place. What is intriguing is that over the 53-year period, when January is positive, the rest-of-year return was also positive with nearly 90% of the time. With subperiod 2007-2009, a positive January has 100% of positive rest-of-year return. 17 years out of the 53-year period when the January was negative, the rest-of-year was down 100 percent. In the most recent financial crisis subperiod 2007-2009, when January was down, it exhibits a very strong negative effect on the average mean of -41 percent. Figure 7 and 8 show the regression of ROY returns versus January returns, January positive, and January negative. The slope in figure 7 appears flatter than anticipated after reading all those past studies that had documented positive January returns. Yet, both positive slopes from figure 8 backs up our findings in table 4 that positive January returns are more likely than not to generate positive returns for the ROY returns. This leads us to conclude that the January returns are likely to be an indicator as to the ROY returns. Figure 9 shows the cumulative ROY returns for positive January, negative January and Buy-and-Hold (B&H) strategy. Positive returns in January outperformed B&H in most of years; but B&H seems to be dominating in the last few years. Negative returns in January never has resulted in better gains in any period.

Holiday Effect

Holiday effect has been investigated in the academic literature. See, e.g., Ariel(1990) and Lakonishok and Smidt (1988). Ariel, in his analysis of the holiday effect, documented that for the CRSP value-weighted and equal-weighted index returns over the 1963-1982 period, the average preholiday return is nine to 14 times higher than the mean return on the remaining days. Lakonishok and Smidt (1988) showed that the holiday effect accounts for some 30 to 50 percent of the total return in the US stock market in the pre-1987 period. Kim and Park (1994) reported that higher returns are persistent before

holidays across all three major stock markets in the US: the NYSE, AMEX, and NASDAQ. It also showed that the holiday effect is not only present in US, it can also be found in the UK and Japanese stock markets. Cadsby and Ratner (1992) found that all countries exhibit pre-holiday effects before local holidays and addressed that pre-holiday effects are significant before local holidays except Hong Kong does so before US holidays.

In our study, six annual holidays specified are Easter Monday, Victoria Day (Monday on or before May 24), Canada Day (1 July), Labor Day (first Monday in September), Thanksgiving (Second Monday in October), and Christmas. A regression-based approach is employed. The results indicate that the Canadian market overall provides evidence of a pre-holiday effect in common with both large and small cap stocks. A regression to show the pre-holiday effect on trading days -3 to +2 around holidays is as following with t-statistics in brackets:

$$R_t = \underset{(-0.407)}{-0.010} - \underset{(-0.011)}{0.002}Day_{-3} + \underset{(2.196)*}{0.330}Day_{-2} + \underset{(1.348)*}{0.203}Day_{-1} + \underset{(2.670)*}{0.402}Day_{+1} - \underset{(-0.303)}{0.046}Day_{+2}$$

* significance level at 5%

The pre-holiday seems to be existing between Day_{-2} and Day_{+1}, beyond this three days period, the return seems insignificant. Table 5 shows the holiday average returns for both Composite, 1977-2009 and SmallCap, 20080-2009. The mean gains for Composite and SmallCap are 0.029% (t= 2.761) and 0.011% (t=0.4878) respectively. Not inconsistent with the regression found above, the abnormal gain are dominant two days before the holiday and one day after. For SmallCap, the mean gain on Day_{+1} was 0.373% (t = 1.7299) and for Composite was 0.186% (t = 2.004).

Sell-in-May and go Away

Halloween brings seasonal market advise – "Sell in May and go Away but buy back on St. Leger Day" has been an old market adage and has been documented in England since 1694. St. Leger Day is a date in late September which refers to the running of a horse race at Doncaster in England. The saying can simply be carried by the investors selling stocks and holding cash in the month of May and buying stocks back in the late month of September. Jacobsen and Bouman (2002) report a closely related strategy and refer it to as the Halloween indicator. It is so named because the investors would have invested starting in October through April.

Studies on US stock market has also report evidence of SIM strategy that outperforms B&H strategy. Dzhabarov and Ziemba (2010) found that Russell 2000 produced a 103.80% higher return with B&H strategy; yet a 147.70% higher return when it is invested with SIM strategy. Figure 10 and 11 show the results of this "Halloween indicator" strategy using the rule "sell on May 1 and buy on the 1st trading day before the end of October" for the S&P/TSX Composite and SmallCap Indices in the years 1993-2009 and 2000-2009 respectively. The gray line shows performance during the SIM strategy whereas Composite and SmallCap both are in black. In figure 10, SIM only outperforms the B&H from 2003-2005, which is a very short period of time in relation to the 16-year period. The B&H strategy in figure 11 clearly is always on top of the graph, meaning that SIM strategy never earns better returns than B&H strategy.

It might seem that trading specific seasonal patterns like the SIM would be a logical approach. In practice, however, this can be challenging. It requires the knowledge of a large number of various patterns in order to begin to differentiate between them. Whether the market adage "Sell in May and go away" observable in Canada can be

further investigated with larger data pool. A lot of times, progressions appear to be seasonal can be just results of purely random historical price movements with no forecasting value.

Conclusion

In a recent article dealing with anomalies on US stock market returns, Dzhabarov and Ziemba(2010) observed that the empirical support for existence of all anomalies been discussed in this paper. Applying similar methods to identifying anomalies on Canadian stock market returns have failed in some and succeeded in others. Instead of finding negative Monday retuns accompany with positive Friday returns, instead, 90 percent of negative Wednesday returns were observed. Holiday effect turns out to be not significant neither. Turn-of-Month effect and pre-holiday effect, on the other hand, have been observed significant. This paper examines solely the anomalies in the Canadian market and discovered that not all anomalies such as the turn-of-the-week effect. Seasonality increases the chance of a price move and is one of the few truly testable trading methods. Yet, whether the anomalies could be deployed as investment opportunities depends on factors not one but many, factors such as skills of market timing and knowledge of markets in general. Anomalies are more indicators than strategies and past data are nevertheless no indicators of plausible forecasting future values.

Table 1(a) Summary Statistics of returns of S&P/TSX Composite Index, CFMRC Equal-, and CFMRC Value-weighted Index, 1977-2009

Time Period	Day of the week	S&P/TSX Composite			CFMRC Equal-weighted			CFMRC Value-weighted		
		Mean	St.Dev.	t-stat*	Mean	St.Dev.	t-stat*	Mean	St.Dev.	t-stat*
(Entire Data) 1977-2009	Monday	-0.0082	0.1931	-1.6659	0.0000	0.0050	-0.0766	-0.0001	0.0045	-0.5257
	Tuesday	0.0012	0.1934	0.2615	0.0002	0.0063	1.0180	0.0001	0.0043	0.5783
	Wednesday	0.0064	0.1868	1.4217	0.0004	0.0041	3.7022	0.0002	0.0043	1.4752
	Thursday	0.0058	0.2076	1.1503	0.0006	0.0081	2.8637	0.0001	0.0042	1.4627
	Friday	0.0083	0.1797	1.8806	0.0008	0.0039	8.7659	0.0003	0.0038	2.7596
1977-1981	Monday	-0.0275	0.3721	-1.1303	0.0000	0.0046	-0.0590	-0.0002	0.0040	-0.8399
	Tuesday	0.0040	0.3369	0.1894	0.0002	0.0041	0.8598	0.0001	0.0036	0.4643
	Wednesday	0.0216	0.3419	1.0175	0.0005	0.0042	2.0267	0.0003	0.0038	1.2459
	Thursday	0.0176	0.3970	0.7121	0.0006	0.0047	2.0352	0.0003	0.0044	0.9476
	Friday	0.0362	0.3620	1.5890	0.0009	0.0046	3.1303	0.0005	0.0041	1.9186
1982-1986	Monday	-0.0268	0.3256	-1.2615	-0.0002	0.0042	-0.6052	-0.0002	0.0034	-0.9019
	Tuesday	0.0041	0.3642	0.1798	0.0001	0.0038	0.4502	0.0001	0.0037	0.3975
	Wednesday	0.0202	0.3349	0.9694	0.0004	0.0040	1.6295	0.0002	0.0034	1.0970
	Thursday	0.0195	0.3544	0.8834	0.0005	0.0040	1.8694	0.0003	0.0036	1.1744
	Friday	0.0184	0.2833	1.0290	0.0007	0.0036	3.2688	0.0003	0.0030	1.3694
1987-1991	Monday	0.0000	0.0035	0.0423	-0.0001	0.0049	-0.3398	-0.0001	0.0048	-0.4693
	Tuesday	0.0001	0.0037	0.6240	0.0000	0.0046	0.0847	0.0000	0.0035	0.1376
	Wednesday	0.0000	0.0031	0.1108	0.0004	0.0051	1.2403	0.0002	0.0040	0.9232
	Thursday	0.0000	0.0032	0.1433	0.0005	0.0031	2.7032	0.0001	0.0028	0.4810
	Friday	-0.0001	0.0051	-0.4124	0.0008	0.0038	3.2970	0.0001	0.0031	0.6393
1992-1996	Monday	0.0001	0.0024	0.7029	-0.0001	0.0049	-0.3398	0.0001	0.0026	0.3911
	Tuesday	0.0001	0.0024	0.8246	0.0000	0.0046	0.0847	0.0001	0.0025	0.9410
	Wednesday	0.0001	0.0023	0.4348	0.0004	0.0051	1.2403	0.0002	0.0023	1.1315
	Thursday	0.0001	0.0022	0.4242	0.0005	0.0031	2.7032	0.0001	0.0022	0.9830
	Friday	0.0001	0.0027	0.5778	0.0008	0.0038	3.2970	0.0001	0.0021	0.8803
1997-2001	Monday	0.0000	0.0054	-0.0902	-0.0001	0.0049	-0.3398	0.0002	0.0049	0.6505
	Tuesday	-0.0001	0.0060	-0.2544	0.0000	0.0046	0.0847	0.0000	0.0055	-0.1390
	Wednesday	0.0001	0.0051	0.1720	0.0004	0.0051	1.2403	-0.0001	0.0059	-0.1919
	Thursday	0.0001	0.0057	0.3895	0.0005	0.0031	2.7032	0.0001	0.0050	0.1886
	Friday	0.0001	0.0050	0.4109	0.0008	0.0038	3.2970	0.0003	0.0055	0.8960
2002-2006	Monday	0.0000	0.0036	0.0873	-0.0001	0.0049	-0.3398	0.0002	0.0034	0.7564
	Tuesday	0.0000	0.0036	-0.0996	0.0000	0.0046	0.0847	0.0000	0.0032	0.0152
	Wednesday	0.0000	0.0035	0.1467	0.0004	0.0051	1.2403	0.0001	0.0034	0.3487
	Thursday	0.0002	0.0031	1.0984	0.0005	0.0031	2.7032	0.0001	0.0032	0.5272
	Friday	0.0002	0.0038	0.7548	0.0008	0.0038	3.2970	0.0002	0.0026	1.2741
2007-2009	Monday	0.0004	0.0081	0.5472	-0.0001	0.0049	-0.3398	-0.0005	0.0084	-0.6466
	Tuesday	-0.0002	0.0076	-0.3779	0.0000	0.0046	0.0847	0.0001	0.0079	0.1913
	Wednesday	0.0000	0.0081	-0.0484	0.0004	0.0051	1.2403	0.0002	0.0071	0.2951
	Thursday	0.0004	0.0066	0.7522	0.0005	0.0031	2.7032	0.0001	0.0077	0.1985
	Friday	-0.0006	0.0095	-0.8111	0.0008	0.0038	3.2970	0.0003	0.0056	0.6647

These returns are defined as $R_t = \ln(P_t/P_{t-1})100$

*Critical value significance level of 10% is +/- 1.28

*Critical value with significance level of 5% is +/- 1.65

Table 1(b) Summary Statistics of returns of S&P/TSX SmallCap Index 2000-2009

Period	2000-2009				
Day	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	**-0.0184**	-0.0103	-0.0021	0.0096	**0.0324**
St.Dev.	0.5821	0.5211	0.5370	0.4873	0.4328
t-stat*	-0.6978	-0.4437	-0.0903	0.4457	1.6863
Period	2000-2002				
Day	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	0.0102	-0.0208	-0.0263	0.0122	0.0280
St.Dev.	0.3692	0.4527	0.4621	0.4304	0.4155
t-stat*	0.3456	-0.5759	-0.7104	0.3528	0.8423
Period	2003-2005				
Day	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	**-0.0048**	0.0114	0.0055	0.0152	**0.0292**
St.Dev.	0.2967	0.3073	0.3484	0.3111	0.2719
t-stat*	-0.1967	0.4514	0.1955	0.6032	1.3306
Period	2006-2007				
Day	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	**-0.0209**	-0.0264	0.0187	-0.0056	**0.0414**
St.Dev.	0.4910	0.4626	0.4919	0.4420	0.3883
t-stat*	-0.4062	-0.5651	0.3805	-0.1263	1.0608
Period	2008-2009				
Day	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	**-0.0813**	-0.0109	0.0038	0.0121	**0.0351**
St.Dev.	1.0618	0.8367	0.8390	0.7581	0.6471
t-stat*	-0.7300	-0.1320	0.0460	0.1609	0.5431

These returns are defined as $R_t = \ln(P_t/P_{t-1})100$

*Critical value significance level of 10% is +/- 1.28

*Critical value with significance level of 5% is +/- 1.65

Table 2 Summary Statistics of average percent return of S&P/TSX SmallCap Index

	Monday	Tuesday	Wednesday	Thursday	Friday
2000	0.0082	-0.0209	-0.0402	0.0342	0.0333
2001	0.0291	-0.0201	-0.0158	-0.0023	0.0211
2002	-0.0067	-0.0214	-0.0229	0.0047	0.0296
2003	0.0103	0.0215	0.0295	0.0316	0.0165
2004	-0.0101	0.0066	-0.0255	0.0062	0.0444
2005	0.0135	0.0174	-0.0075	-0.0055	0.0185
2006	0.0610	0.0294	-0.0113	-0.0588	0.0072
2007	-0.0039	0.0095	-0.0600	0.0264	0.0161
2008	-0.0904	-0.1001	-0.0697	-0.0075	0.0061
2009	0.0574	0.0279	-0.0111	0.0068	0.0342

These returns are defined as $R_t = \ln(P_t/P_{t-1})100$

Table 3 Summary Statistics of Equal- and Value-weighted Index, 1977-2009

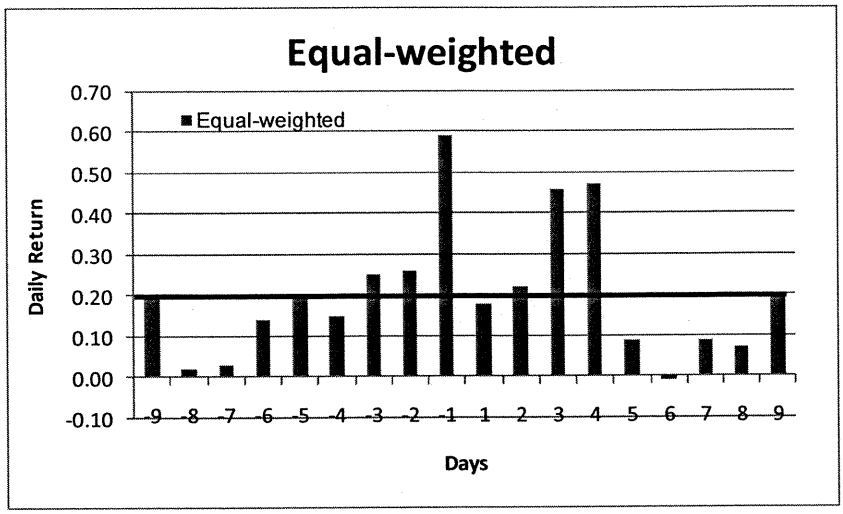
	Sixteen-year cumulative returns							
	Equal-weighted Index				Value-weighted Index			
	Mean	St.Dev.	t-stat*	Cumulative Return	Mean	St.Dev.	t-stat*	Cumulative Return
Day_{-1} to Day_{+4}	0.347%	0.020	7.849	68827.26%	0.134%	0.009	6.431	301.60%
Day_{+5} to Day_{+9}	0.127%	0.008	6.845	1153.87%	0.024%	0.009	1.196	149.04%

These returns are defined as $R_t = \ln(P_t/P_{t-1})100$

*Critical value with significance level of 10% is +/-1.28

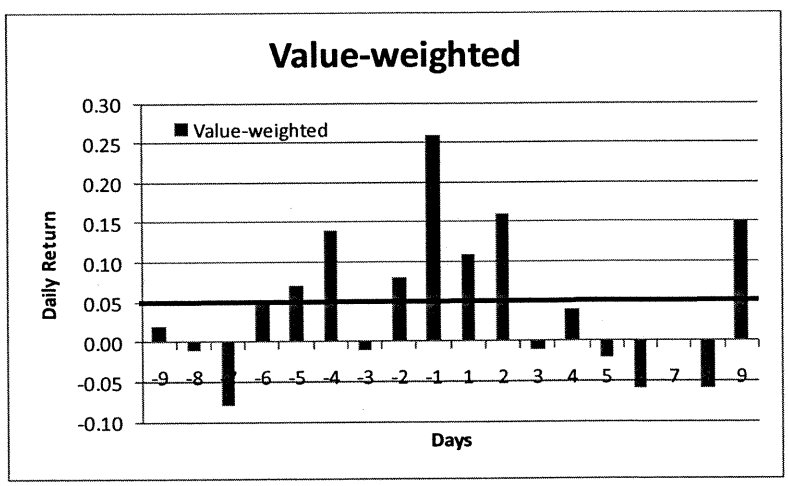
*Critical value with significance level of 5% is +/- 1.65

Figure 1 Canadian Turn-of-the-Month Effect.
Mean Daily Returns on Trading Days -9 to +9, 1977-2009



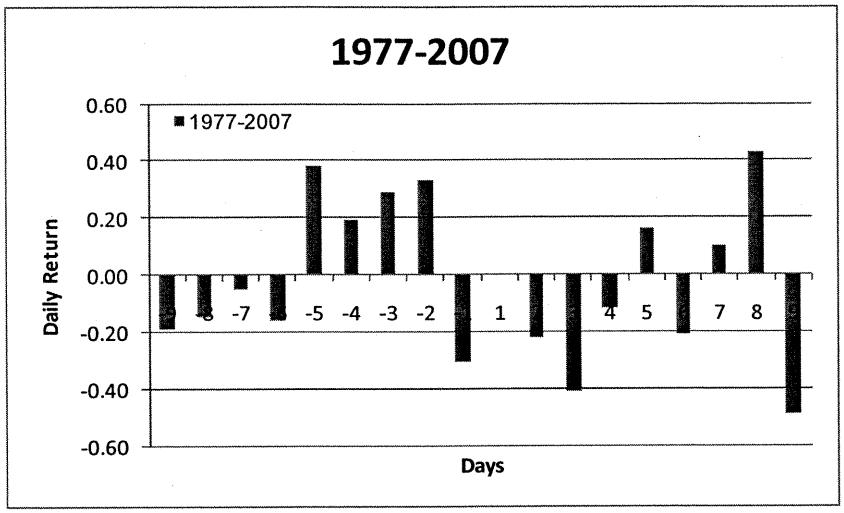
Mean = 0.2
These returns are defined as $R_t = \ln(P_t/P_{t-1})100$

Figure 2 Canadian Turn-of-the-Month Effect.
Mean Daily Returns on Trading Days -9 to +9, 1977-2009



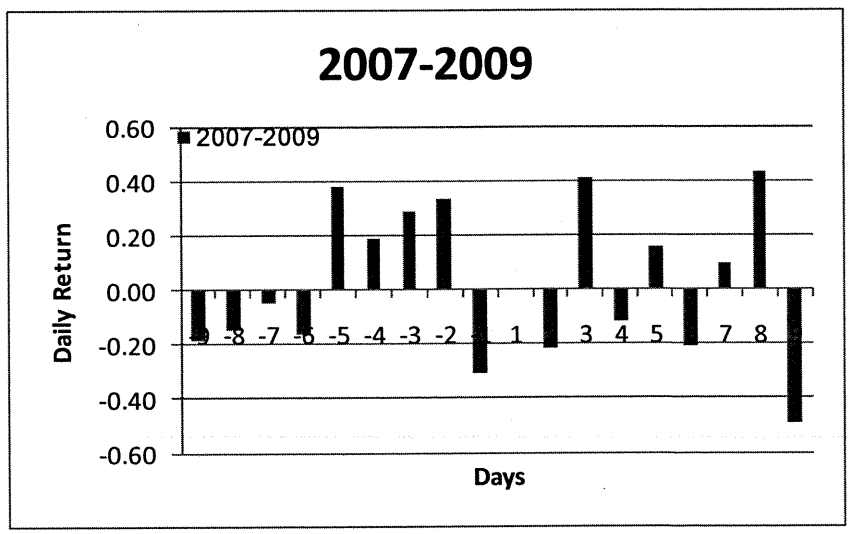
Mean=0.05
These returns are defined as $R_t = \ln(P_t/P_{t-1})100$

Figure 3 S&P/TSX Composite Index
Daily Return during Ture-of-Month (TOM), 1977-2007



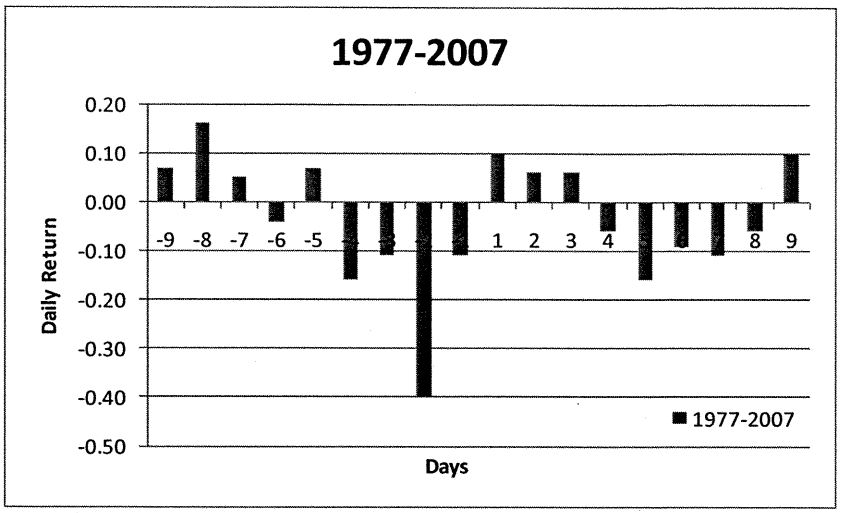
These returns are defined as $R_t = \ln(P_r/P_{t-1})100$

Figure 4 S&P/TSX Composite Index
Daily Return during Ture-of-Month (TOM), 2007-2009



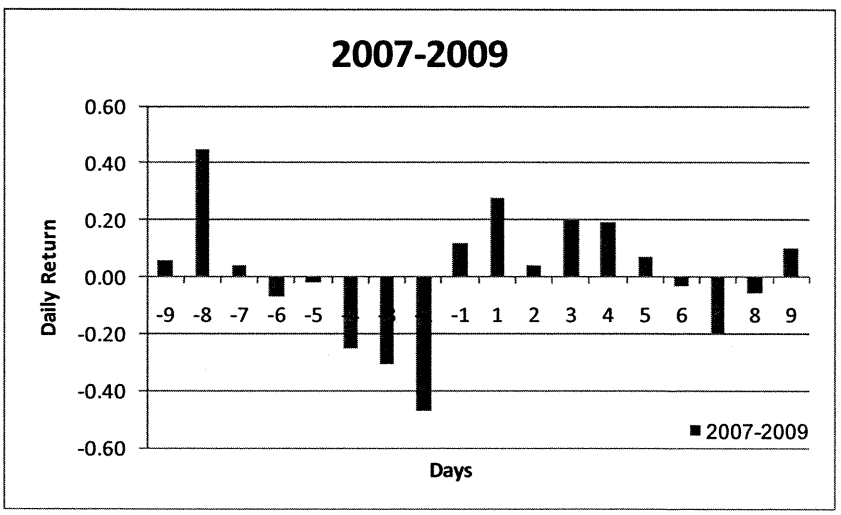
These returns are defined as $R_t = \ln(P_r/P_{t-1})100$

Figure 5 S&P/TSX SmallCap Index
Daily Return during Ture-of-Month (TOM), 1977-2007



These returns are defined as $R_t = \ln(P_r/P_{t-1})100$

Figure 6 S&P/TSX SmallCap Index
Daily Return during Ture-of-Month (TOM), 2007-2009



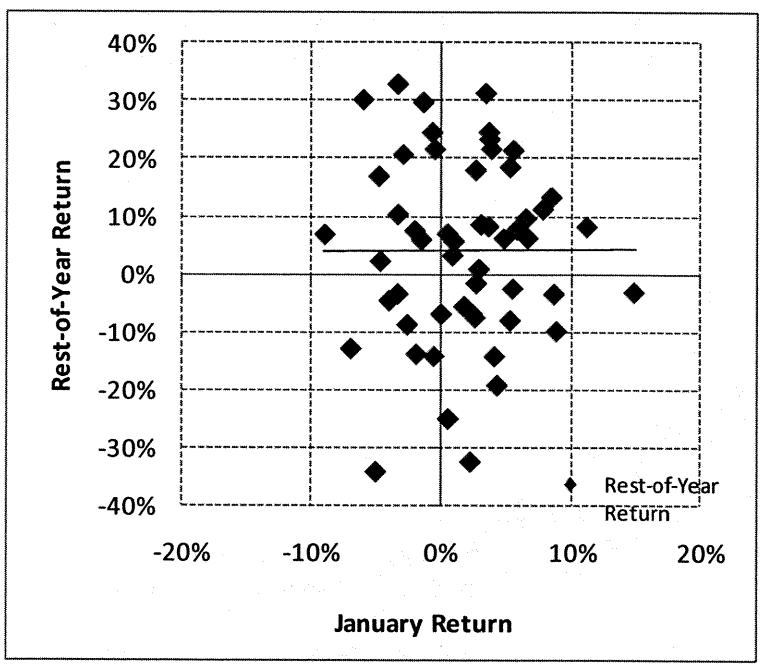
These returns are defined as $R_t = \ln(P_r/P_{t-1})100$

Table 4 January Barometer Results
1956-2009, S&P/TSX Composite
2000-2009, S&P/TSX SmallCap

				Mean Return						Mean Return
			18 Years						3 Years	
			52.94%	35.89%					**50%**	7.25%
			ROY up						100% up	
	34 Years						6 Years			
	January up						January up			
			14 Years						3 Year	
			41.18%	-19.54%					**50.00%**	-13.42%
53 Years			ROY down		9 Years				ROY down	
Composite					SmallCap					
1956- 2009					2000-2009					
			12 Year							
			63.16%	33.81%					0 Year	
			ROY up						0.00%	0.00%
	19 Years						3 Year			
	January down						January down			
			7 Years						3 Year	
			36.84%	-21.32%					100%	-0.07%
			ROY down						ROY down	

These returns are defined as $R_t = \ln(P_r/P_{t-1})100$

Figure 7 January Return vs. Rest-of-Year Return for S&P/TSX Composite Index 2000-2009



These returns are defined as $R_t = \ln(P_r/P_{t-1})$

Table 6 Summary Statistics of returns of S&P/TSX Composite Index and S&P/TSX SmallCap, 2000-2010

S&P/TSX Composite Index, 2000-2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average	St. Dev.	t-stat*
Jan	7.36%	-14.31%	-0.14%	-0.22%	3.09%	4.92%	-2.18%	0.08%	3.20%	-6.80%	**-0.50%**	0.062	-0.265
Feb	3.59%	-6.00%	2.76%	-3.28%	-2.33%	-0.58%	3.55%	0.92%	-1.73%	7.10%	**0.40%**	0.039	0.338
Mar	-1.22%	4.35%	-2.42%	3.76%	-4.06%	-2.56%	0.77%	1.89%	4.30%	6.70%	**1.15%**	0.036	1.055
Apr	-1.03%	2.67%	-0.09%	4.07%	2.08%	2.51%	-3.84%	4.66%	5.43%	10.62%	**2.71%**	0.040	2.271
May	9.71%	-5.35%	-6.90%	1.78%	1.51%	3.03%	-1.13%	-1.07%	-1.70%	0.05%	**-0.01%**	0.046	-0.005
Jun	2.05%	-0.60%	-7.86%	3.86%	-1.03%	5.12%	1.86%	-0.27%	-6.23%	3.90%	**0.08%**	0.043	0.062
Jul	7.78%	-3.85%	0.10%	3.42%	-0.96%	2.33%	2.03%	-1.51%	1.30%	0.75%	**1.14%**	0.031	1.201
Aug	-8.05%	-7.88%	-6.75%	-1.19%	3.42%	3.16%	-2.62%	3.16%	-15.85%	4.73%	**-2.79%**	0.067	-1.372
Sep	-7.38%	0.69%	1.10%	4.63%	2.31%	-5.88%	4.84%	3.66%	-18.55%	-4.34%	**-1.89%**	0.073	-0.858
Oct	-8.89%	7.55%	5.02%	1.11%	1.78%	4.16%	3.25%	-6.61%	-5.17%	4.80%	**0.70%**	0.056	0.415
Nov	1.28%	3.48%	0.67%	4.50%	2.37%	4.06%	1.22%	1.05%	-3.10%	2.58%	**1.81%**	0.022	2.761
Dec	4.25%	-0.52%	-0.68%	3.59%	-0.46%	5.80%	0.97%	-5.03%	-3.31%	-5.71%	**-0.11%**	0.039	-0.094
Average	**0.79%**	**-1.65%**	**-1.27%**	**2.17%**	**0.64%**	**2.17%**	**0.73%**	**0.08%**	**-3.45%**	**2.03%**	**0.22%**		
St.Dev.	0.063	0.061	0.040	0.026	0.024	0.035	0.027	0.033	0.074	0.054		0.015	
t-stat*	0.413	-0.895	-1.048	2.811	0.905	2.068	0.902	0.077	-1.544	1.241			
Geom r	7.49%	-19.85%	-14.97%	28.90%	7.66%	28.58%	8.65%	0.30%	-36.59%	25.29%			

S&P/TSX SmallCap Index, 2000-2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average	St. Dev.	t-stat*
Jan		3.65%	-2.37%	1.80%	-3.81%	-5.96%	2.01%	-2.18%	-5.38%	7.74%	**-0.50%**	0.046	-0.362
Feb	-13.07%	0.52%	-4.76%	4.70%	0.58%	5.56%	-2.74%	-0.94%	3.13%	-3.04%	**-1.01%**	0.054	-0.616
Mar	7.06%	-6.45%	0.05%	-4.54%	5.89%	6.37%	-1.73%	-4.12%	-1.73%	-9.12%	**-0.83%**	0.056	-0.489
Apr	0.66%	-5.17%	-3.26%	-3.68%	-3.32%	-2.89%	2.38%	-2.45%	-2.75%	-11.46%	**-3.19%**	0.036	-2.910
May	1.10%	3.44%	5.51%	-2.42%	1.83%	-0.40%	2.69%	1.52%	1.67%	1.35%	**1.63%**	0.021	2.550
Jun	-5.76%	2.87%	7.91%	-8.34%	4.10%	-4.81%	-1.82%	1.01%	8.48%	-3.71%	**-0.01%**	0.058	-0.004
Jul	1.91%	4.58%	1.24%	-3.93%	1.58%	0.15%	-0.41%	7.57%	-0.76%	-5.49%	**0.64%**	0.038	0.566
Aug	-8.44%	10.28%	4.45%	0.34%	-5.18%	-3.30%	6.99%	-2.26%	22.40%	-9.77%	**1.55%**	0.098	0.526
Sep	4.13%	-1.22%	1.69%	-7.07%	0.93%	7.13%	-7.16%	-2.96%	27.54%	0.21%	**2.32%**	0.099	0.775
Oct	3.79%	-5.94%	-0.10%	-3.68%	-5.16%	-4.09%	0.30%	10.84%	10.79%	-5.61%	**0.11%**	0.064	0.059
Nov	7.83%	-7.90%	-4.32%	-2.53%	-2.29%	-4.41%	-0.45%	-1.85%	-5.57%	-5.95%	**-2.74%**	0.043	-2.105
Dec	-4.45%	-1.67%	0.80%	-0.83%	-1.84%	-6.54%	-1.18%	7.32%	0.26%	3.20%	**-0.49%**	0.038	-0.425
Average	**-0.48%**	**-0.61%**	**0.84%**	**-2.91%**	**-0.26%**	**-0.66%**	**-0.28%**	**1.24%**	**5.77%**	**-4.49%**	**-0.18%**		
St.Dev.	0.066	0.056	0.04	0.035	0.036	0.049	0.036	0.051	0.107	0.047		0.024	
t-stat*	-0.241	-0.361	0.696	-2.758	-0.240	-0.447	-0.258	0.806	1.788	-3.168			
Geom r	-8.95%	-4.54%	6.18%	-26.89%	-7.15%	-13.59%	-1.78%	10.69%	67.14%	-35.77%			

These returns are defined as $R_t = \ln(P_t/P_{t-1})100$

*Critical value of 2-tailed t-test with significance level of 10% is 1.28

*Critical value of 2-tailed t-test with significance level of 5% is 1.65

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