A MONTHLY EFFECT IN STOCK RETURNS: REVISITED

by

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Bachelor of Commerce, University of British Columbia, 2002

PROJECT SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF BUSINESS ADMINISTRATION

In the
Faculty
of
Business Administration

Global Asset and Wealth Management Program

SIMON FRASER UNIVERSITY

Fall 2005

APPROVAL

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Degree: **Master of Business Administration**

Title of Project: **A Monthly Effect in Stock Returns: Revisited**

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Date Approved: November 22, 2005

ABSTRACT

This paper examines whether the monthly effect continues to exist in the CRSP equally-weighted and value-weighted stock market indices. I also examine for the monthly effect in the TSX/S&P Composite index. More recent evidence indicates that the monthly anomaly has weakened in the CRSP equally-weighted and value-weighted indices but a turn-of-month effect has appeared. I also find the turn-of-the month effect in the TSX/S&P Composite index for time period 1977-2002. These conclusions indicate that a trading strategy could be developed by switching between the stock market index and a cash bearing account during the turn-of-the-month in the U.S. and Canadian marketplace.

DEDICATION

To my dearest family who have always been there for me in the highs and especially in the lows.

ACKNOWLEDGEMENTS

I owe a deep debt of gratitude to Dr. Rob Grauer, who sacrificed a lot of his time to help me with this project. I appreciate the care at which he reviewed my first draft and for the conversations that we had that clarified my thinking on this and other matters. Also, special thanks go to Dr. Daniel Smith who has provided useful comments on improving my paper.

Finally, I would also like to thank my classmates who have influenced my thinking over the last two years. To each of you I give a warm-hearted thanks and I look forward to our continued relationship in the future.

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1 INTRODUCTION: SEASONAL ANOMALIES

Evidence of seasonal anomalies in stock market returns has generated considerable interest among the general public in recent years and a significant amount of research has been devoted towards documenting anomaly existence and its potential for generating superior risk-adjusted returns.

The January effect, for example, is the best known and most documented seasonal anomaly. Watchel (1942) first observed that unusually high returns accrue to stocks during January, while Rozeff & Kinney (1976) rediscovered the same phenomenon twenty-five years later. Keim (1983), Roll (1983) and Reinganum (1983) also note that the high January returns accrue disproportionately to small firms.

Several explanations have been offered for the January effect. Wachtel (1942) proposed that the January effect could be the result of year-end selling of stocks and a "general feeling of good fellowship and cheer" during Christmas holidays (Wachtel, pg. 186). Wachtel's comments are considered the most likely explanation for the January anomaly and have received the strongest support in the academic literature. On the other hand, Ritter and Chopra (1989) suggest that portfolio rebalancing by portfolio managers to sell smaller, less known corporations is another likely reason for the anomaly.

Also, the information hypothesis proposed by Ritter (1988) suggests that informed investors have an advantage when trading at the end of the year as management becomes aware of non-public information. Since a typical individual tends to buy a significant number of small-

cap stocks this information asymmetry results in the increased volatility of smaller stocks in January.

Another popular anomaly is the Monday seasonal in equity returns, also known as the weekend effect. Evidence that Monday returns are negative and significantly different from the other days of the week was first presented by French (1980). In his study, French used the S& P 500 index to study daily returns during the period 1953 – 1977 and found that the mean return for Monday was negative while the mean return was positive for all the other days of the week. Possible explanations for the weekend effect include the timing of corporate news announcements (Penman 1987) and the trading patterns of institutional and individual investors (Lakonishok & Maberly, 1990).

A lesser known and more recently documented seasonal anomaly is the monthly effect. Ariel (1987) first reported a monthly seasonal pattern in the returns of equally-weighted and value-weighted stock portfolios between 1963 and 1981, using data obtained from the Centre for Research in Security Prices (CRSP). In his study, he found that stock returns in the first half of the month, which he defined as the first nine trading days of the month plus the last trading day of the previous month, are considerably higher than stock returns in the second half of the month, identified as the last nine trading days of the month, exclusive of the last trading day. Furthermore, Henzel and Ziemba (1996) demonstrate how the monthly seasonal can be exploited from an institutional standpoint. This paper researches this phenomenon further by examining whether or not the anomaly continues to exist in the CRSP equally-weighted and value-weighted stock market indices. I also examine for the anomaly in the TSX/S&P Composite index.

This paper consists of five sections, starting with the introduction. Section 2 summarizes the literature in this area. Section 3 states the data and methodology. Section 4 reports and discusses the results. Section 5 concludes the paper and provides guidance for future research.

2 LITERATURE REVIEW

2.1 Initial Research

Ariel (1987) first reported a monthly seasonal pattern in the returns of equally-weighted and value-weighted stock portfolios between 1963 and 1981, using data obtained from the Centre for Research in Security Prices (CRSP). In his study, he found that stock returns in the first half of the month, which he defined as the first nine trading days of the month plus the last trading day of the previous month, are considerably higher than stock returns in the second half of the month, identified as the last nine trading days of the month, exclusive of the last trading day. Hence, he refers to the first half of the month (FH) as trading days -1 to +9, and the last half of the month (LH) as trading days -9 to -2 (Refer to Table 5). Ariel also notes that the monthly anomaly is especially strong between the last trading day of the prior month and the first four days of the next month (trading days -1 to +4).

In his study, Ariel also computes the cumulative returns earned over the nineteen-year period from investing only in stocks during the first half of the month and from investing in stocks only during the last half of the month. The results are profound. He finds that if you had invested in an equally-weighted index only during the first half of the month for the nineteen-year period, you would have earned a cumulative return of 2,552.40%. Conversely, holding stocks for the last half of the month would "put you in the red" with a cumulative return of -0.25%! In conclusion, Ariel finds that the market's entire cumulative advance was in the first half of the month, with the last half of the month contributing nothing.

In a subsequent study, Lakonishok and Smidt (1988) do not find a significant monthly seasonal on the Dow Jones Industrial Average (DJIA) over a ninety-year period (between 1897

and 1987). In their study, they defined a month as the first through the fifteenth calendar day of the month, if it is a trading day, or if not, through the next trading day. The last half of the month consists of the remaining days.

The results are intriguing. They conclude that the average difference (difference between first half of the month and last half of the month) for the entire period is 0.237 percent, which is much less than 1 percent of the difference that Ariel reported in his study. Clearly, the way in which you define the first half of the month and the last half of the month has a significant impact on the existence of the monthly anomaly. Also, what's more interesting is that the average rate of return is positive for both halves of the month. They find that for the whole sample period, only 55.4 percent of the months have higher returns in the first half than in the second half. Ariel's evidence of a higher rate of return during the first half of the month appear to be partly the result of including the last trading day of the previous month as part of the first half of the month.

However, Lakonishok and Smidt's study do reveal a strong turn-of-the-month (TOM) effect. They find that average rates of return are especially high during trading days -1 to +3 as shown by Table 1. The cumulative increase over the TOM is 0.473 percent, whereas the average increase for a four-day period is 0.0612. It appears that daily stock returns do not exhibit a monthly effect but rather a TOM effect when looking at daily returns of the DJIA over a ninety-year period.

Table 1 Daily rates of return (%) of the DJIA around the TOM

Trading Day	-4	-3	-2	-1	1	2	3	4
Mean	0.002	-0.023	0.061	0.122	0.084	0.127	0.140	0.016
Median	0.051	-	0.087	0.123	0.137	0.147	0.132	0.079

Lakonishok and Smidt, pg. 418-419.

On the non-turn-of-the-month, they find that the DJIA goes down. For example, trading days 5 to 9 had an average daily return of -0.001 percent and trading days -9 to -5 had an average daily return of -0.032 percent.

2.2 International Evidence

It is possible that the monthly effect (or the TOM) in the U.S equity markets are the result of sampling error and data mining. As a result, it is extremely important to test the existence of the monthly anomaly in a different sample period from which it was discovered. Alternatively, foreign market indices could be studied to determine if a monthly anomaly also exists in those countries (Lakonishok and Smidt, 1988). If the anomaly occurs in other markets, this provides greater support for the conclusion that the anomaly exists.

In an international study, Jaffe and Westerfield (1989) examine daily stock returns in foreign countries and find weak evidence supporting the monthly effect. However, they find strong evidence of a "last day of the month" effect as well as a country unique monthly pattern (one that is not consistent with the U.S market).

They compiled a daily record of four stock market indices of Japan, Canada, Australia, and the United Kingdom. The specific foreign indices and times periods are: Japan – Nikkei Dow from January 5, 1970 to April 30, 1983; Canada – Toronto Stock Exchange (TSE) from January 2, 1977 to November 30, 1983; Australia – Statex Actuaries from January 1, 1973 to April 30, 1985; and U.K. – Financial Times Ordinary Share from January 2, 1950 to November

30, 1983. They also included the last trading day of each calendar month in the first half of the month to be consistent with Ariel's methodology.

They present monthly patterns of daily returns for all four countries from days -9 to +9 and report a difference of the means test based on the differing returns in the two halves of the month. Based on their results, they find that Australia exhibits a significant monthly effect consistent with the U.S effect while Japan exhibits a significant reverse monthly effect. A reverse monthly effect means that the average daily returns in the second half of the month is significantly higher than the average daily returns in the first half of the month. For Canada and the U.K, there appears to be no significant monthly effect at all.

The rest of their paper concentrates on "the last day of the month" effect by calculating the average daily return for each country on the last trading day of the month and comparing it to the average return on all the other days. Despite finding weak evidence supporting the monthly effect in foreign markets, they do find a "last day of the month" effect which is consistent with Ariel's findings.

Based on Jaffe and Westerfield's study, it appears that even though the weekend effect and the January effect have received supporting evidence from foreign countries, the same cannot be said of the monthly anomaly. This anomaly does not persist when extended to an international context.

However, through examination of eleven international stock market indices, Cadsby and Ratner (1992) do find compelling evidence of the TOM effect in some foreign countries.

Table 2 International TOM Effects

Country and Period	Turn of Month (in %)	Not Turn of Month (in %)
US (e.w) 07/03/62-12/31/87	0.21	0.04
US (v.w.) 07/03/62-12/31/87	0.13	0.02
Canada 01/03/75-12/31/87	0.26	0.13
Japan 01/05/79-12/28/88	0.08	0.06
Hong Kong 01/02/80-08/01/89	0.10	0.06
UK 08/16/83-06/13/88	0.18	0.04
Australia 01/02/80-08/01/89	0.14	0.03
Italy 01/02/80-08/01/89	0.10	0.10
Switzerland 01/02/80-08/01/89	0.21	0.003
West Germany 01/02/80-08/01/89	0.23	0.003
France 01/02/80-08/01/89	0.08	0.07

Cadsby and Ratner, pg. 501.

They analyzed the daily historical closing prices of eleven stock market indices from ten different countries. Arithmetic mean returns were then calculated and compared for each index over various periods. In the United States, the returns from July 3, 1962 to December 31, 1987 for the CRSP equal-weighted and value-weighted indices were used. The Canadian data come from the TSE equally-weighted index for the period January 3, 1975 to December 31, 1987. The Nikkei Index was used for Japan for period January 5, 1979 to December 28, 1988. The Financial Times 500 Share Index was used for the U.K. for period August 16, 1983 to June 13, 1988. The Hang Seng Index was used for Hong Kong, the All Ordinaires Index for Australia, the Banca Commerciale Index for Italy, the Swiss Bank Corporation Industrials Index for

Switzerland, the Commerzbank Index for Germany, and the Compagnie des Agents de Change General Index for France. Daily returns in these six countries were looked at from January 2, 1980 to August 1, 1989.

Table 2 above reports average returns at the TOM and NTOM. In all cases, the TOM returns exceed the NTOM returns. Also, the significance of the difference between the TOM and the NTOM was tested at the 1% and 5% level of significance.

According to Table 2, Cadsby and Ratner conclude that the TOM effects are significant in the United States, Canada, the United Kingdom, Australia, Switzerland, and West Germany. However, there is no evidence of the same effect in Japan, Hong Kong, Italy or France when the TOM is defined as the last and first three trading days of the month.

In another provocative study on international market indices, Kunkel, Compton, and Beyer (2003) studied the daily stock returns in 19 countries from 1988 to 2000 to look for recent TOM effects. They find that the TOM effect persists in 16 of the 19 countries. The countries that they examined include eight European countries (Austria, Belgium, Denmark, France, Germany, Netherlands, Switzerland, and UK), six Far East countries (Australia, Hong Kong, Japan, Malaysia, New Zealand, and Singapore), two North American countries (Canada and the United States), two Latin American countries (Brazil and Mexico), and South Africa. These stock market indices account for 77% of the foreign market capitalization value as of December 1998. They first examine the 18 days around the TOM to determine if any of the mean daily returns are significantly different from zero. Their results are impressive. For 16 of the 19 countries, the tests show a TOM effect during the full period under study. The 16 countries include the eight European countries and two North American countries, four of the six Far East countries, one of the two Latin American countries, and South Africa. They do not find the anomaly in Brazil,

Hong Kong or Malaysia. They also find that the 4-day TOM effect accounts for 87% of the monthly returns!

Clearly, the TOM effect is an international phenomenon that persists well beyond any reasonable time period for the market to adapt to and eliminate its pattern. The existence of compelling international evidence provides ample support of monthly regularities worldwide.

2.3 Exploitation: An Institutional Perspective

In an intriguing paper, Henzel and Ziemba (1996) demonstrate how the monthly seasonal can be exploited from an institutional standpoint. Their trading strategy involves switching between the S&P 500 index and an interest bearing cash account at the TOM (which they define as trading days -1 to +4) for the period 1928 to 1993. Specifically, what they do is invest in the index during the turn-of-the-month and switch to a cash account for the remainder of the month. Clearly, institutional investors can use this strategy to time purchases and sales of investments. One caveat to note in their study is that transaction costs are not deducted from the trading strategy. Thus, the returns they report are overestimated. However, Henzel and Ziemba argue that institutional investors can take advantage of futures thereby dramatically reducing the transaction costs. Thus, they state there is no need to deduct transaction costs from the returns.

Table 3 compares large-cap (S&P 500) and small-cap (bottom 20% of New York Stock Exchange companies, capitalization-weighted) returns with the returns from two investment strategies. The investment strategies involve investing in the S&P 500 during the TOM or first-half (FH), and then in cash, receiving interest for the remainder of the month. It is assumed that these strategies are in cash 80% and 60% of the time, respectively. In this study, TOM represents days -1 to +4 and FH represents days -1 to +9.

Table 3 Returns for Various Investment Strategies

Investment Strategy	Monthly Average Return (%)	Monthly Standard Deviation (%)	Yearly Average Return (%)	Yearly Standard Deviation (%)	Growth of $1 Investment
Large-Cap	0.79	5.80	9.50	20.11	$439.13
Small-Cap	0.96	8.71	11.53	30.18	$1,483.63
TOM + 0.80 Cash	0.84	2.54	10.13	8.79	$758.36
FH + 0.60 Cash	0.92	3.64	11.06	12.62	$1,290.97

Henzel and Ziemba, pg. 20.

The strategy of being invested in the S&P 500 during the TOM or the FH and then in cash show consistently higher mean returns relative to the large-cap buy-and-hold strategy. To emphasize the magnitude of this effect, they also calculate the growth of an imaginary $1 invested in the various strategies. This is shown in the last column of Table 3. Even though the small-cap buy-and-hold strategy earned the highest monthly average return, when all the strategies are adjusted for risk, you will find that the TOM and FH strategies clearly dominate over this 65-year sample period.

For completeness, they also compute the correlations of these trading strategies with other investments to determine if these additional strategies can provide additional diversification benefits to current holdings. They find that the correlations between the TOM strategy and large and small capitalization stocks are 0.46 and 0.38, respectively. For the FH strategy, the correlation with large and small capitalization stocks is 0.67 and 0.57, respectively. Therefore, these strategies may be of interest to institutional investors who seek additional portfolio diversification.

2.4 Exploitation: An Individual Perspective

In a similar study, Kunkel and Compton (1998) examine whether or not individual investors can exploit the TOM effect, and avoid the transaction costs, by implementing the switching strategy in a tax-deferred, no cost retirement plan.

The data set includes the daily closing unit values of the Stock Account and the Money Market Account for the Teachers Insurance and Annuity Association-College Retirement Equities Fund (TIAA-CREF) during the period April 1, 1988 to the last day of December, 1997. The switching strategy is similar to the methodology employed by Henzel and Ziemba, where funds are transferred between a market portfolio at the TOM and then switched back to cash at the last day of the TOM. In this study, the Money Market Account is selected as the cash account and the Stock Account is selected as the market portfolio. Transfers between accounts can be conducted online 24 hours a day. Furthermore, there are no restrictions on transfers between accounts, and no transactions fees for the transfer. Lastly, because this is a retirement fund, tax liabilities are not triggered.

The buy-and-hold strategy involved placing an imaginary $1,000 in the Stock Account on April 4, 1988. The money is left in the Stock Account for the duration of the study. The switching strategy is implemented by placing $1,000 in the Stock Account on April 4. The switching of funds is done on a monthly basis by moving funds into the Stock Account during the TOM period and back into the Money Market Account during the rest-of-the-month.

Table 4 outlines the performance results for the switching and buy-and-hold strategy as well as several well-known risk-adjusted performance measures. Performance measures such as the Sharpe Ratio show that the switching strategy outperforms the buy-and-hold strategy for the sample period involved. Between 4/1988 and 12/1997, the switching strategy achieved an

average daily compounded return of 0.065% compared to an average daily compound return of 0.057% for the buy-and-hold strategy.

Table 4 Switching between Money Market and Stocks Around the Turn-of-the-month

Investment Strategy	Average Daily Return (%)	Return Standard Deviation (%)	Beta	Sharpe Ratio	Growth of $1,000 Investment
Mmkt	0.023	0.017	-	-	$1,740
Stock	0.057	0.683	0.824	0.0625	$4,118
Switch	0.065	0.350	0.219	0.1429	$4,921

Kunkel and Compton, pg. 18.

These switching strategies not only provide additional diversification benefits, because of low correlations with the S&P 500, but they are also able to outperform the buy-and-hold strategy on a risk-adjusted basis. Clearly, it is beneficial from an individual's perspective to consider adjusting asset classes each month to exploit the monthly effect.

3 DATA AND METHODOLOGY

I utilize the CRSP value-weighted and equally-weighted stock index returns for the period December 31, 1962 to December 30, 2003 to determine if the monthly effect exists. I first replicate Ariel's 1987 study by analyzing the daily stock index returns over the period December 31, 1962 to November 27, 1981. To avoid data-snooping bias, I exactly follow Ariel's methodology by only analyzing the 18 trading days around the turn of the month, and dropping all other trading days.

Ariel defines the first half of the month as days -1 to +9 and the last half of the month as days -9 to -2. For example, trading day -1 is the last trading day of the previous month, and trading day +1 is the first trading day of the month. He finds that the mean returns for stocks are positive only for days during the first half of the month, and indistinguishable from zero for days during the last half of the month. Furthermore, he finds that stock mean returns are significantly strong around the turn-of-the month which he defines as trading days -1 to +4 (Table 5).

Table 5 Definitions relating to the Monthly Phenomenon

Period	Abbreviation	Trading Days
First half of Month	FH	-1 to +9
Last half of Month	LH	-9 to -2
Turn of the Month	TOM	-1 to +4

I then analyze the period December 31, 1981 to December 30, 2003 to determine if the monthly effect exists in more recent periods. Finally, I test the entire 40-year period December 31, 1962 to December 30, 2003.

In all three sample periods noted above, I first compute the average daily returns for all 18 trading days separately. I then compute the average daily return for the total period, the FH, and the LH. Finally, I determine whether or not average daily returns during the FH are significantly greater than the LH. If the monthly effect still persists in more recent periods, we can conclude with greater certainty that the anomaly is real, and not the result of data snooping bias.

I also examine the TSX/S&P Composite Index, for evidence that the monthly effect exists in Canadian markets. I obtain daily closing values for the TSX/S&P Composite from Bloomberg for the period January 31, 1977 to December 30, 2002. To ensure consistency, I utilize the same methodology as in my analysis of the CRSP equally-weighted and value-weighted stock market indices as noted above. In this examination, I also try to determine whether or not daily mean returns are significantly higher during the FH when compared to the LH.

4 RESULTS

The results in Table 6 and Table 7 indicate that during the period 1963-1981 average daily returns during the FH are significant (economically) higher than average daily returns during the LH in the CRSP equally-weighted and value-weighted indices. For example, in the value-weighted index, I find that the average daily returns during the days of the LH to be negative or below the overall mean of 0.035%. Furthermore, I find that the average daily return is 0.086% over trading days -1 to +9 and -0.028% over trading days -9 to -2. These results are quite similar to what Ariel found in his 1987 study.

The results are quite mixed between the equally-weighted and value-weighted indices for sample period 1982-2003. For the value-weighted index, most of the positive average daily returns occur between trading days -4 to +4, with stronger returns around the TOM. The average daily mean returns over trading days -1 to +9 is 0.068% while the average daily mean returns over trading days -9 to -2 is 0.025%. In comparison, the average daily return over the entire period is 0.049%. It appears that when we extend the data set to a more recent period, the existence of the monthly anomaly weakens. There is no significant difference between the average daily returns over the FH and the LH. Furthermore, the average daily returns of the FH and the LH are close to the average daily returns over the entire period. Ariel's discovery that the average daily return during the FH is significantly greater than the average daily returns during the LH has disappeared when extending the data set to a more recent period.

I get similar results for the equally-weighted index; however, the TOM effect is more prominent in this instance. The overall mean over this time period is 0.101%. The average daily returns for the TOM trading days -1, +1, +2, +3, +4, respectively, are 0.456%, 0.146%, 0.185%,

Table 6 **Average daily returns (in percent) for different days of the month for CRSP value-weighted index**

Day	1963-1981	1982-2003	1963-2003
-9	-0.091	-0.004	-0.048
-8	-0.089	0.054	-0.018
-7	0.012	-0.060	-0.024
-6	-0.037	-0.021	-0.029
-5	-0.042	-0.005	-0.024
-4	0.015	0.080	0.047
-3	0.027	0.047	0.037
-2	-0.024	0.111	0.044
-1	0.158	0.182	0.171
+1	0.049	0.190	0.120
+2	0.104	0.144	0.124
+3	0.171	0.113	0.142
+4	0.070	0.042	0.056
+5	0.046	-0.007	0.020
+6	0.067	-0.052	0.007
+7	0.092	-0.027	0.032
+8	0.057	0.020	0.039
+9	0.052	0.078	0.065
Overall mean	0.035	0.049	0.042
Daily mean over -1 to +9	0.086	0.068	0.077
Daily mean over -9 to -2	-0.028	0.025	-0.002
Daily mean over TOM	0.111	0.134	0.122

0.165%, and 0.163%. For the other trading days, the average daily returns are either near or below the overall mean. For this index, the average daily return over trading days -1 to +9 is 0.141%, while the average daily return over trading days -9 to -2 is 0.051%. Clearly, in the equally-weighted index, there are significantly higher returns during the FH compared to the LH, which was not discovered in the value-weighted index.

Table 7 **Average daily returns (in percent) for different days of the month for CRSP equally-weighted index**

Day	1963-1981	1982-2003	1963-2003
-9	-0.052	-0.024	-0.038
-8	-0.100	0.068	-0.016
-7	0.006	-0.004	0.001
-6	0.028	0.068	0.048
-5	-0.037	0.029	-0.004
-4	-0.004	0.067	0.031
-3	0.040	0.063	0.051
-2	0.045	0.146	0.095
-1	0.267	0.456	0.361
+1	0.164	0.146	0.155
+2	0.123	0.185	0.156
+3	0.182	0.165	0.174
+4	0.130	0.163	0.147
+5	0.097	0.059	0.078
+6	0.078	0.001	0.039
+7	0.132	0.027	0.079
+8	0.096	0.075	0.085
+9	0.094	0.132	0.113
Overall mean	0.072	0.101	0.087
Daily mean over -1 to +9	0.137	0.141	0.139
Daily mean over -9 to -2	-0.009	0.051	0.021
Daily mean over TOM	0.174	0.223	0.199

For the 1963-2003 period, I find the monthly anomaly in the value-weighted index (Table 6). For this index, I observe significantly higher returns in the FH when compared to the LH. For example, for trading days -1 to +9, the average daily return is 0.077%, while the average daily return over trading days -9 to -2 is -0.002%. I observe positive average daily returns for trading days -4 to -2, but negative returns for all other trading days during the LH. What's interesting is that when we extend the data set to period 1982-2003, the monthly anomaly disappears, but if we

test the entire period 1963-2003, then the anomaly reappears. The only explanation I have for this is that during the period 1963-1981, there appears to be significantly strong negative returns during the LH. However, in the period 1982-2003, average daily returns during the LH are just a tad above zero. Hence, once we combine these two periods, the monthly anomaly appears due to the strong negative skew in the earlier period.

For the equally-weighted index (Table 7), I observe a strong TOM effect. The average daily return over TOM is 0.1986% while the average daily return over the entire period is 0.087%. Clearly, the incremental returns by investing strictly during the TOM are favourably compared to a buy-and-hold strategy during this time period. For example, the average daily returns over trading days -1 to +9 is 0.139%, while the average daily returns over trading days -9 to -2 is 0.021%. The TOM mean return still compares favourably to the mean returns over the FH and the LH. In particular, trading day -1 has an average daily return of 0.361%, over 4 times the average daily returns over the entire 40-year period.

When I utilize the same methodology to the TSX/S&P Composite, I get some interesting results. Table 8 indicates that there is a strong TOM effect during the period 1977 to 2002. This is not surprising considering other researchers have discovered either the monthly effect or the TOM effect in international markets (Cadsby and Ratner, 1992).

During this time period, I observe the average daily return to be 0.033%, while the TOM average daily return is 0.144%. The average daily return over the FH is 0.073% while the average daily return over the LH is -0.017%. Therefore, it appears that a trading strategy could be employed where you long the Canadian market during the TOM, and switch over to a cash

Table 8 **Average daily returns (in percent) for different days of the month for TSX/S&P Composite index**

Day	1977-2002
-9	-0.060
-8	-0.010
-7	-0.097
-6	0.016
-5	-0.029
-4	0.040
-3	-0.019
-2	0.021
-1	0.208
+1	0.132
+2	0.192
+3	0.098
+4	0.091
+5	-0.010
+6	-0.057
+7	0.027
+8	-0.023
+9	0.076
Overall mean	0.033
Daily mean over -1 to +9	0.073
Daily mean over -9 to -2	-0.017
Daily mean over TOM	0.144

bearing account in the LH. This is similar to what Henzel and Ziemba do in their 1996 study of the S&P 500 market index. They determine that you can achieve superior risk-adjusted returns by switching between the market and cash rather than invest in a buy-and-hold strategy. They do not take account of trading costs but mention that futures can be employed to minimize costs. A similar trading strategy can be employed for the TSX/S&P Composite which may result in higher returns and lower risk when compared to a buy-and-hold strategy over this time period. The trading strategy results in higher returns because you can take advantage of the monthly anomaly

by only being in the market when there are persistently strong positive returns and avoid the market when there are persistently negative or near zero returns. The strategy results in lower risk because of low correlations between the TSX/ S&P Composite and cash.

Table 9 and 10 show the cumulative compounded returns for the FH, the LH, the TOM, and the second week for the CRSP equally-weighted and value-weighted index. For the equally-weighted index, the cumulative compounded returns over the FH are always higher than the cumulative compounded returns over the LH. Similarly, for the value-weighed index, the cumulative compounded returns over the FH are always higher than the cumulative compounded returns over the LH. What's interesting is during the 1982-2003 period, the TOM cumulative compounded return of 449.58% is the highest amongst all categories, with the FH cumulative compounded returns not far behind at 435.61%.

In both indices, investing only during the LH result in lower cumulative compounded returns relative to all other categories, while a strategy focused on investing only during the FH would generally lead to higher cumulative compounded returns.

Table 9 Cumulative Returns for the CRSP equally-weighted index

Category	1963-1981	1982-2003	1963-2003
First Half of Month	1,998.62%	3,739.06%	80,467.39%
Last Half of Month	-19.92%	180.24%	124.41%
Turn of Month	598.34%	1,725.93%	12,651.21%
Second Week	200.52%	110.25%	531.84%

Table 10 Cumulative Returns for the CRSP value-weighted index

Category	1963-1981	1982-2003	1963-2003
First Half of Month	569.66%	435.61%	3,486.79%
Last Half of Month	-43.69%	53.96%	-13.30%
Turn of Month	240.12%	449.58%	1,769.24%
Second Week	96.89%	-2.54%	91.89%

Table 11 shows the cumulative compounded returns that you would have earned by investing during the TOM, the FH, the LH, and the second week in the TSX/S&P Composite index.

Table 11 Twenty-five year Cumulative Returns for the TSX/S&P Composite Index

Category	1977-2002
First Half of Month	774.92%
Last Half of Month	-41.05%
Turn of Month	789.17%
Second Week	-1.60%

The results in Table 11 are intriguing. The cumulative returns over the FH are 774.92%, while the cumulative return over the LH is -41.05%. What's also interesting is the cumulative return over TOM is 789.17%, the highest amongst all categories. Lastly, the cumulative returns over the second week (defined as trading days +5 to +9) are near zero at -1.60%. I can conclude that a monthly anomaly exists in Canadian markets and that all the positive returns stem mainly from trading days -1 to +4. The other trading days of the month practically generate negative or near-zero returns. A trading strategy would be effective in this case in generating superior risk-adjusted returns, especially for institutions where trading costs are low.

Explanations for the monthly effect

Why does the monthly effect exist? Ogden (1990) addressed this question by providing evidence that the monthly effect is probably driven by liquidity and a standardization of payments in the United States. Payments such as wages, interest and dividends at the end and beginning of the month are reinvested by investors at the TOM, resulting in a surge in stock returns.

In addition to monthly payments, Penman (1987) proposed that the timing of corporate earnings announcements could possibly influence the monthly pattern of stock returns. In an examination of corporate earnings announcements for the period 1928 to 1982, he finds that earnings which are accompanied by positive changes in stock prices tend to occur at the beginning of the quarter. Therefore, it is possible that corporate earnings news during the early part of the first month of calendar quarters could be inducing the monthly effect.

Another reason could be the fact that institutional investors make seasonally related changes in their portfolios referred to as "window dressing." The logic is that investment managers get rid of poor stocks before reporting dates to make their portfolios look better. Coincidentally, these reporting dates typically coincide at month-end (Thaler, 1987).

5 CONCLUSION

The efficient market hypothesis postulates that security returns cannot be predicted based on looking at past price behavior. However, this paper has given some insight regarding the apparent seasonal anomalies in stock market returns and the possibility of exploitation of these seasonal anomalies, in particular the monthly effect. Past research papers indicate that from an institutional and individual standpoint that utilization of the monthly effect in the formation of a trading strategy will lead to superior risk-adjusted returns. Therefore, these conclusions present a potentially serious challenge to empirical models of market equilibrium.

More recent evidence indicates that the monthly anomaly has weakened in the CRSP equally-weighted and value-weighted indices but a turn-of-month effect has appeared. Also, a strong turn-of-the month effect was observed in the TSX/S&P Composite index for time period 1977-2002. In particular, the average daily return over the TOM is 0.144% while the average daily return over the LH is -0.017%. These conclusions indicate that a trading strategy could be developed by switching between the stock market index and a cash bearing account during the turn-of-the-month in the U.S. and Canadian marketplace. A question to ponder is whether or not individual investors can exploit the monthly anomaly in the Canadian marketplace? Furthermore, why does the monthly anomaly still exist in the marketplace? More importantly, why does it exist? The implication of these questions is that the monthly anomaly remains a fertile ground for academic research.

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