TURN-OF-THE-MONTH ANOMALY IN STOCK RETURNS: REVISITED

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

MASTER OF FINANCIAL RISK MANAGEMENT

In the
Financial Risk Management Program

Of the Faculty of

Business Administration

SIMON FRASER UNIVERSITY

Summer 2010

APPROVAL

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Degree: **Master of Financial Risk Management**

Title of Thesis: **Turn-of-the-Month Anomaly in Stock Returns: Revisited**

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Abstract

This paper test for the existence of the turn-of-the-month (TOM) anomaly in stock returns and examines its economic importance by comparing a switching strategy, which utilizes the TOM effect, to a buy-and-hold for equities and risk-free investing. It investigates the TOM anomaly in the CRSP equal- and value-weighted indices for the 1963-2009 period. It also tests for the significance of the anomaly in Fama-French (FF) large and small size portfolios.

Results for the CRSP equal- and value-weighted indices show statistically significant differences in returns between TOM and ROM. Results employing the FF 10 large and 10 small portfolios also support the existence of the TOM anomaly with the only exception being the FF 10 large portfolio for the sub-period of 1982-2009. Further, although buy-and-hold strategy seemingly outperforms the switching strategy for the CRSP equal-weighted and the FF 10 large portfolio in terms of annual compound return, the switching strategy earns abnormal return on a risk-adjusted basis.

DEDICATION

To my parents, who have encouraged and supported me throughout my life- THANK YOU.

Mohammed

I would like to thank my parents' for their continued support for as many years. Without their support, I could never have made it this far. To them I dedicate this paper.

Xiao Jie (Athena)

ACKNOWLEDGEMENTS

We would like to thank Dr. Rob Grauer for his kindness, patience, encouragement, and great support for this project. Also, special thanks to Dr. Alexander Vedrashko for being a second reader for this project.

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1. Introduction

Much investigation has been devoted to seasonal anomalies of equity returns, such as the holiday effect, size effect, monthly effect and January effect. The existence of seasonal anomalies challenges the random walk characteristics of the efficient market hypothesis (EMH).

The holiday effect was first discovered by Fields (1931, 1934). Fields studied the DJIA index, and showed that daily pre-holiday mean returns were higher than the daily post holiday returns. Ariel (1985) investigated the effect using the CRSP (Center-for-research-in-security-prices) equal- and value-weighted indices over the period 1963-1982. He concluded that for the equal-weighted index, the daily mean returns were over nine times higher pre-holiday than post-holiday and 14 times higher for the value-weighted index. Lakonishok and Smidt (1987) examined the holiday effect with the DJIA data over a 90 year horizon, and found the effect to be a profound 23 times.

The size effect anomaly was initially noted by Banz (1981) and Reinganum (1981). They showed that average daily returns for small-cap firms exceeded those for large caps. Moreover, using data obtained from the New York Stock Exchange (NYSE) and the American Stock Exchange (AMEX), they found no less than 20% excess returns for small caps over big caps. Roll (1981) pointed out that the anomaly exists due to underestimated beta for smaller firms, in that they are less frequently traded or more prone to disappear as a result of acquisition and mergers by larger companies. Brown, Kleidon and Marsh (1983) argued that in some years, smaller firms outperformed larger firms, and in some other periods the result switched.

Wachtel (1942) first noted the January effect, an economic phenomenon that higher returns are realized the month of January more than any other month. Wachtel attributes the effect to cash preferences during the Christmas holiday. Other explanations include tax-loss selling and window dressing. Keim (1983), Roll (1983) and Reinganum (1983) linked the January effect to the pattern in small firm returns at the end of the year.

Ariel (1986) first examined the monthly effect and discovered a significant excess return around the turn of the month (TOM) and the first half of the month (FH) using CRSP equal- and value-weighted indices. The trading month is defined as the last trading day of the previous months plus trading days in the following month excluding the last trading day. By discarding the odd middle trading day, each month is evenly divided into FH (first half) and SH (Second half). His finding showed that the mean returns for FH outperformed those for SH, and it further suggested that the turn of the month (TOM) (i.e. -1 to +4) days had the highest mean returns.

The paper proceeds as follows. Section 2 reviews the turn-of-the-month literature. Section 3 contains the data and methodology. A dummy variable regression investigates the statistical significance of the turn-of-the-month effect for the period of July 01, 1963 to December 31, 2009. It also compares a"TOM+Cash" strategy to a buy-and-hold and an investment in a risk-free account, as a test of the economic significance of the TOM effect. Section 4 analyzes the results. Section 5 provides conclusions.

2. Literature Review

2.1 Evidence from the US and Canada

Ariel (1986) first discovered that "the mean return for stocks is positive only for days immediately before and during the first half of calendar months, and indistinguishable from zero for days during the last half of the month." He also noted that "this monthly effect is independent of other known calendar anomalies" and the nineteen years cumulative effect of the said effect is "by no means small".

Ariel found his results on excess returns for FH over LH, excluding the month of January, were significant. For the entire testing period (1963-1981), a positive daily mean return over the FH was found to be 1.411% and 0.826% for the equal- and value-weighted indices respectively. More importantly, Ariel defined TOM (turn-of-month) days as the last day of previous month plus first 4 days of the following month; and the rest of the days in the trading month as ROM (rest-of-the-month). On the other hand, LH generated negative mean returns of -0.021% and -0.182% for the two said indices. In addition, possible dividend effect and ex-dividend tax effect were also tested, and the significance of FH over LH still held.

Lakonishok and Smidt (1988) tested the existence of the monthly effect using 90 years' (1897-1986) worth of daily Dow Jones Industrial Average (DJIA) data, which is considered to be a reasonable proxy for the large capitalization industrial company component of the market portfolio. They defined FH as the first 15 days of each calendar month, and the remaining days of the month as LH. Contrary to Ariel's finding, they did not find "any consistent tendency for returns in the first part of the month to be higher" than the remaining part. They attributed the December effect, abnormally high returns in

the last half of December over the 90-year testing period, to Wall Street window dressing. They further pointed out that the monthly effect in Ariel's paper was partly due to the inclusion of the last trading day of previous month into the FH, and partly due to distinctive features of the sample period.

Henzel and Ziemba (1996) argued that the turn-of-the-month anomaly could be exploited by implementing a switching strategy between the S&P500 index and an interest bearing cash account. Money would be transferred to the S&P500 index on TOM or FH days, and to an interests bearing cash account on the ROM days. Their paper complied with Ariel's definition for TOM. Analyzing the S&P500 data from 1928 to 1993, they agreed with Ariel on TOM and FH effects. However, they also revealed the five-day period, -2 to +3, had even higher returns.

Kunkel and Compton (1998) continued the research on the existence of the turn-of-the-month effect by investigating DJIA, S&P500 indices, and a stock account. The stock account data was obtained from a non profit retirement fund (TIAA-CREF). They replicated Henzel and Ziemba (1996) by switching money between a money market account (i.e., cash account) and a market portfolio (i.e., stock account). They also investigated if the switching strategy could be exploited by an individual investor over the testing period from April 1, 1988 to December 31, 1997. Interestingly, their results showed significant TOM effects on the stock account as well as on DJIA and the S&P500 indices. Moreover, by implementing the switching strategy for the period of 1988 to 1997, Kunkel and Compton concluded that the switch strategy would outperform the buy-and-hold strategy for the S&P500. Table 1 shows the switching strategy outperforms other strategies.

Table 1

Average daily return, Standard Deviation, and Beta for the period April 1988 to December 1997

Period	**Average Daily Return (%)**	**Standard Deviation (%)**	**Beta**	**Growth of $1000**
4/1988-12/1997				
Money Market Account	0.023	0.017	-	$1,740
Stock Account	0.057	0.683	0.824	$4,118
Switch Strategy	0.065	0.350	0.219	$4,921

Beta for the Stock Account and the switch strategy are calculated by regressing the daily return of each with the daily Return for the S&P 500 under the same period. From Kunkel and Compton(1996)

Pham (2005) applied Ariel's methodology to replicate Ariel's result for 1963-1981, and further conducted tests for 1983-2003 using CRSP equal- and value-weighted indices as well as for 1977-2002 using the S&P/TSX composite. His findings confirmed those of Ariel's with TOM days yielding the highest returns in each sub-period (see Table 2).

Gopal (2005) replicated Pham's work by utilizing the CRSP value-weighted and equal-weighted stock index returns for the period of December 31, 1962 to December 31, 2005 and extended the study by using a dummy variable regression to determine the significance of the TOM effect. Additionally, portfolio betas and Jensen's alpha were used to determine if the investment within the TOM days would generate diversification benefits and positive risk-adjusted returns relative to the market portfolio. He also performed an extension to Pham (2005) for the S&P/TSX composite index over the period of Jan 31, 1977 to December 30, 2002.

Gopal found that during the period of 1963-2005 and sub-periods of 1963-1982 and 1983-2005 the returns from TOM days were significantly different from daily returns in the CRSP data for both equally and value-weighted indices, and for the S&P/TSX composite index. Moreover, following Hensel and Ziemba (1996), he employed four investment strategies (buy-and-hold, TOM+Cash, FH and LH) to examine the growth of $1 investment using the CRSP data over the full period 1963-2005 and the two sub-periods of 1963-1981 and 1982-2005 (see Table 3).

Table 2

Average daily returns (in percent) for different days of the month for CRSP equal- and value -weighted index, 1963-2003, and TSX/S&P Composite index, 1977-2002

Panel A. Average daily returns (percent) for different days of the month for CRSP value-weighted index

Day	1963-1981	1982-2003	1963-2003
-1	0.158	0.182	0.171
+1	0.049	0.19	0.12
+2	0.104	0.144	0.124
+3	0.171	0.113	0.142
+4	0.07	0.042	0.056
Daily mean over TOM	0.111	0.134	0.122
Daily mean over (FH)	0.086	0.068	0.077
Daily mean over (SH)	-0.028	0.025	-0.002

Table 2 continued

Panel B. Average daily returns(percent) for different days of the month for CRSP equal-weighted index

Day	1963-1981	1982-2003	1963-2003
-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	0.13	0.163	0.147
Daily mean over TOM	0.174	0.223	0.199
Daily mean over (FH)	0.137	0.141	0.139
Daily mean over(SH)	-0.009	0.051	0.021

Panel C. Average daily returns (percent) for different days of the month for TSX/S&P Composite index

Day	1977-2002
-1	0.208
+1	0.132
+2	0.192
+3	0.098
+4	0.091
Daily mean over TOM	0.144
Daily mean over (FH)	0.073
Daily mean over (SH)	-0.017

From Pham(2005)

Table 3

Trading rules applied to CRSP equal- and value-weighted index, 1962-2005

Panel A. Trading rules applied to CRSP value- weighted data

	Value of $1 invested			1962/12/31 to	2005/12/31		
	1981/12/31 to 2005/12/31	**1962/12/31 to 1981/12/31**	**1962/12/31 to 2005/12/31**	**Compounded Annual Growth**	**Port Beta**	**Jensen's Alpha**	**Jensen's Alpha t-stat**
TOM+ Cash	$ 15.61	$ 7.36	$ 137.78	12.14%	.239	.020	5.34
Buy and Hold	$ 3.46	$ 17.05	$ 79.61	10.72%			
Risk free	$ 2.20	$ 2.49	$ 10.17	5.54%			

Panel B. Trading rules applied to CRSP equal-weighted data

	Value of $1 invested			1962/12/31 to	2005/12/31		
	1981/12/31 to 2005/12/31	**1962/12/31 to 1981/12/31**	**1962/12/31 to 2005/12/31**	**Compounded Annual Growth**	**Port Beta**	**Jensen's Alpha**	**Jensen's Alpha t-stat**
TOM+ Cash	$ 57.60	$ 16.04	$ 997.76	17.42%	.238	.014	3.89
Buy and Hold	$ 272.87	$ 23.32	$ 6,658.55	22.72%			
Risk free	$ 2.49	$ 2.20	$ 10.17				

From Gopal (2005)

Gopal's findings showed that an investment of $1 using the "TOM+Cash" for the CRSP value-weighted would generate the best annual compounded growth rate of 12.14%, while for the equally-weighted index the best rate of return (22.72%) was achieved using the buy- and- hold strategy.

2.2 Evidence from international markets

Numerous empirical studies showed a clear pattern in the US stock market for a turn-of-the-month effect; worldwide evidence also supported the existence of the TOM anomaly. Cadsby and Ratner (1991) investigated if the turn-of-the-month anomaly can be exploited outside the US market. Their study consisted of eleven indices from ten foreign countries. They concluded that the TOM effect (defined as -1 to +3) was significant in 6 countries, namely the US, Canada, UK, Australia, Switzerland, and West Germany, while no evidence for existence of the TOM effect was found other countries (see Table 4).

Agrawal and Tendon (1994) investigated indices for 18 countries for the period 1971 to 1987. They concluded that strong evidence of TOM effect appeared in eleven indices for the 1970's period, but only seven indices continued to show the said effect in the 1980's.

Kunkel and Compton and Beyer (2003) investigated 19 countries for the 4-day TOM effect. They used an OLS regression to test if the mean return for the TOM days was significantly different from zero. Their study showed that the TOM effect could be exploited in some international markets, although, surprisingly, during the period tested (1994 to 2000) the US index didn't show a significant TOM effect. They therefore concluded that the TOM anomaly was an international phenomenon.

Table 4

International TOM and ROM effects

Country and period	**TOM**	**ROM**	**(TOM – ROM)**
US (Equally weighted)	0.0021	0.0004	0.0016
07/03/62-12/31/87	(8.606)*	(3.719)*	(6.370)*
US (Value weighted)	0.0013	0.0002	0.0011
07/03/62-12/31/87	(5.572)*	(1.882)**	(4.101)*
Canada	0.0026	0.0013	0.0012
01/03-75-12/31/87	(9.843)*	(8.819)*	(6.668)*
Japan	0.0008	0.0006	0.0002
01/05/79-12/28/88	(2.324)**	(3.414)*	(-0.518)
Hong Kong	0.001	0.0006	0.0004
01/02/80-08/01/89	(-0.9763)	(-1.303)	(-0.351)
UK	0.0018	0.0004	0.0014
08/16/83-06/13/88	(2.881)*	(-1.139)	(1.860)**
Australia	0.0014	0.0003	0.0011
01/02/80-08/01/89	(2.868)*	(-1.295)	(1.835)**
Italy	0.001	0.001	0.00002
01/02/80-08/01/89	(1.742)**	(2.833)*	(-0.029)
Switzerland	0.0021	0.00003	0.0021
01/02/80-08/01/89	(5.675)*	(-0.1376)	(4.769)*
West Germany	0.0023	0.00003	0.0023
01/02/80-08/01/89	(4.792)*	(-0.1339)	(4.124)*
France	0.0008	0.0007	0.0001
01/02/80-08/01/89	(1.689)**	(2.877)*	(-0.215)

Results were calculated using the dummy variable regression $R_t = a + b\tau_t + \varepsilon_t$

The t-statistic is presented in parentheses, Significantly greater than zero at the 1% level with one-tailed test,*

***Significantly greater than zero at the 5% level with one-tailed test, From Cadsby and Ratner (1991)*

2.3 Explanations for the turn of the month anomaly

Many studies have shown that the turn of the month anomaly can be exploited as a predicted opportunity for excess returns. Why does it exist? Thaler (1987) pointed out that institutional investors sold losers in their portfolios to clean up their holdings before the reporting dates, and the reporting dates happened to be around the end of the month; these “window dressing” activities attributed to the substantial returns around the turn of the month.

Another possible explanation for the monthly anomaly is the timing of corporate news releases. Penman (1987) analyzed the corporate earnings announcements for the period 1928 to 1982. He found earnings correlating with positive changes in stock prices tended to occur at the first month of the calendar quarters.

A different possible reason for the month anomaly is the standardized payment system in the United States. Ogden (1990) argued that the payment system was behind the surge in stock returns around the TOM days, and that cash receipts were paid to investors around the end of the month; consequently investors injected more cash around that time into stocks.

3. Data and methodology:

This paper first performs a statistical test to examine the existence of TOM effects using CRSP equal- and value-weighted daily data and Fama-French (FF) size portfolios[1]. The test period is from July 1, 1963 to December 31, 2009 with two sub- periods, 1963-1981, and 1981-2009 respectively. This paper employs a dummy variable regression.

$$R_t = a + b\tau_t + \varepsilon_t \tag{1}$$

Where:

R_t = Return on the portfolio at time t

a = Average return on the non-TOM day (ROM)

b = Return on the TOM day minus the return on the non-TOM day (ROM)

τ_t = Dummy variable, where it equals 1 for TOM day and 0 for non-TOM day (ROM)

The null hypothesis is that there is no difference between mean returns on the TOM days and the non-TOM days (ROM), i.e. $b = 0$

The paper then performs an economic test for excess returns using Jensen's (1968) alpha.

$$r_p - r_f = \alpha_p + \beta_p (r_m - r_f) + \varepsilon \tag{2}$$

Where:

$r_p - r_f$ = excess return on the portfolio

[1] The FF size portfolios are obtained from the Kenneth French data library:

http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

α_p = Jensen's alpha (abnormal return)

β_p = Beta of the portfolio

$r_m - r_f$ = excess return on the market portfolio

The null hypothesis is that $\alpha_p = 0$.

4. Results

4.1 Tests for statistical differences in TOM and ROM returns

Table 5 contains the results from the dummy variable regression (1). Statistically significant differences are found between TOM and ROM days for the whole testing period (1963-2009) and the two sub-periods, namely 1963-1982 and 1983-2009.

The intercept (ROM average daily returns) for the CRSP value-weighted index is significant overall with a t-value of 2.05. However this result doesn't hold for the two sub-periods with t-values lower than the critical value at the 5% significance. Further, the regression slope, average excess returns of TOM over ROM, shows strong significance with high t-values of 4.17 for the whole period, and 3.98 and 2.55 respectively for the two sub- periods (see Table 5 Panel A).

Results for the equal-weighted index are shown in Table 5 Panel B. Intercepts are significant for all the testing periods with t values higher than 3. The regression slopes (average excess returns of TOM over ROM) are highly significant with t-values of 7.68, 5.66 and 4.49 for the three testing periods.

The results hold for the FF 10 large and 10 small size portfolios (see Table 5 Panels C and D), with 1982-2009 sub-period. The FF 10 large portfolios is the only

exception (t-value for slope=1.41). However, the intercepts are no longer significant except for FF 10 large portfolio over the 1963-2009 and 1982-2009 periods.

Table 5

Results from the dummy variable regression of daily returns on dummy variable $R_t = a + b\tau_t + \varepsilon_t$

Where:

R_t *= Daily Return on the portfolio at time t*

a *= Average daily return on the non-TOM day (ROM)*

b *= Return on the TOM day minus the return on the non-TOM day (ROM)*

τ_t *= Dummy variable, where it equals 1 for TOM day and 0 for non-TOM day (ROM)*

Panel A. Value-weighted Index

	01/07/1963 to 31/12/2009	**01/07/1963 to 31/12/1981**	**31/12/1981 to 31/12/2009**
Intercept (Non-Tom) ROM	0.000211	0.000099	0.00025
t-stat	2.057	0.795	1.676
TOM	0.001	0.001	0.001
t-stat	4.166	3.979	2.545
R-squared	0.002	0.003	0.001

Panel B. Equal-weighted Index

	01/07/1963 to 31/12/2009	**01/07/1963 to 31/12/1981**	**31/12/1981 to 31/12/2009**
Intercept (Non-Tom) ROM	0.000483	0.000366	0.00057
t-stat	5.575	3.07	4.744
TOM	0.001	0.001	0.001
t-stat	7.68	5.657	4.487
R-squared	0.005	0.007	0.003

Table 5 continued

Panel C. FF large-cap portfolio			
	01/07/1963 to 31/12/2009	**01/07/1963 to 31/12/1981**	**31/12/1981 to 31/12/2009**
Intercept (Non-Tom) ROM	0.024008	0.005054	0.03644
t-stat	2.206	0.372	2.327
TOM	0.064	0.091	0.045
t-stat	2.851	3.283	1.412
R-squared	0.001	0.002	0
Panel D. FF small-cap portfolio			
	01/07/1963 to 31/12/2009	**01/07/1963 to 31/12/1981**	**31/12/1981 to 31/12/2009**
Intercept (Non-Tom) ROM	0.014765	0.021781	0.010163
t-stat	1.682	1.658	0.868
TOM	0.134	0.14	0.13
t-stat	7.432	5.196	5.4
R-squared	0.005	0.006	0.004

4.2 Tests for economic differences in TOM and ROM returns

Table 6 Panel A shows that for CRSP value-weighted index, the "TOM+Cash" strategy, which invests in the market for the last day of the previous month (-1) to the first four days of the following months (+4), and invests in a risk-free account for the rest of the month, dominates the Buy-and-Hold (invest in the market for all the time) and Risk-free investing, with the highest compounded annual growth rate of 10.63% and a relatively low portfolio beta of 0.2315. Jensen's alpha (0.021%) with highly significant t-

stat (5.52) further indicates the strategy has superior payoff over buy-and-hold and risk-free investments.

Table 6 Panel B indicates that for CRSP equal-weighted index, although "TOM+Cash" strategy still generates a high compound annual return (15.75%), the buy-and-hold strategy provides a substantial result of 21.03% compound annual return and an impressive $9,537 for the $1 investing over the whole testing period (1963/07/01 to 2009/12/31). This outcome is about nine times higher in value than the terminal value of $1,119 "Tom+Cash" strategy generates. However, "TOM+Cash" strategy still proves to be a good diversification approach for risk-averse investors, in that it bears considerably low portfolio beta (0.2512) and yields an abnormal return. Given the fact that "Tom+Cash" strategy has only 5 trading days' exposure to the market and that the strategy yields an expected high Jensen's alpha of 0.029% annually for the testing period with significant t-stat of 8.75, it's safe to conclude that on a risk-adjusted basis "TOM+Cash" strategy still performs well. In addition, the higher Jensen's alpha for the equal-weighted index over value-weighted index indicates that TOM effect is stronger in small firms.

Table 6

Tests of economic significance

Panel A. Trading rules Applied to CRSP data value-weighted

	Value of $1 invested			1963/07/01 to	2009/12/31		
	1963/07/01 to 2009/12/31	**1963/07/01 to 1981/12/31**	**1981/12/31 to 2009/12/31**	**Compound Annual Growth**	**Port Beta**	**Jensen's Alpha***	**Jensen's Alpha t-stat**
TOM + Cash	$127.36	$8.31	$15.32	10.63%	0.2315	0. 021	5.57
Buy and Hold	$81.35	$4.45	$18.25	9.60%			
Risk free	$12.38	$3.19	$3.88	5.38%			

Panel B. Trading rules Applied to CRSP data equal-weighted

	Value of $1 invested			1963/07/01 to	2009/12/31		
	1963/07/01 to 2009/12/31	**1963/07/01 to 1981/12/31**	**1981/12/31 to 2009/12/31**	**Compound Annual Growth**	**Port Beta**	**Jensen's Alpha***	**Jensen's Alpha t-stat**
TOM + Cash	$1119.37	$17.01	$65.78	15.75%	0.2512	0.029	8.75
Buy and Hold	$9537.08	$24.09	$395.87	21.03%			
Risk free	$12.38	$3.19	$3.88	5.38%			

**Jensen's alpha was calculated using the given formula* $r_p - r_f = \alpha_p + \beta_p(r_m - r_f) + \varepsilon$ *, alpha is in percentile.*

Table 7, Panel A establishes that for the FF 10 large portfolio, "TOM+Cash" strategy remains the said competitive edge with low portfolio beta (0.237), high alpha (0.01101) and significant t-stat (2.73), although the buy-and-hold method generates a slightly higher compound annual growth rate over time. Table 7, Panel B also demonstrates that for the FF low portfolio, "TOM+Cash" strategy outperforms the other two investing methods with strikingly high alpha of 2.7% and highly significant t-stat (7.68).

Table 7

Trading rules for the FF large and small size portfolio, 1963-2009

Panel A. Trading rules applied to FF large-cap portfolio for a value of $1 invested

				1963/07/01 to	2009/12/31		
	1963/07/01 to 31/12/2009	**1963/07/01 to 31/12/1981**	**1981/12/31 to 31/12/2009**	**Compound Annual Growth**	**Port Beta**	**Jensen's Alpha**	**Jensen's Alpha t-stat**
TOM + Cash	$29.26	$4.3	$6.79	7.29%	0.237	0.01101	2.73
Buy and Hold	$52.91	$3	$17.58	8.62%			
Risk free	$4.07	$1.74	$2.33	2.97%			

Panel B. Trading rules applied to FF small-cap portfolio for a value of $1 invested

				1963/07/01 to	2009/12/31		
	1963/07/01 to 31/12/2009	**1963/07/01 to 31/12/1981**	**1981/12/31 to 31/12/2009**	**Compound Annual Growth**	**Port Beta**	**Jensen's Alpha**	**Jensen's Alpha t-stat**
TOM + Cash	$166.61	$8.87	$18.77	11.25%	0.154	0.02716	7.68
Buy and Hold	$156.88	$11.27	$13.91	11.11%			
Risk free	$4.07	$1.74	$2.33	2.97%			

**Jensen's alpha was calculated using the formula* $r_p - r_f = \alpha_p + \beta_p(r_m - r_f) + \varepsilon$ *, alpha is in percentile.*

5. Conclusion

This paper investigates the existence of the TOM effect in stock returns and explores its economic importance. Results comply with past researches that TOM effect prevails. Results from dummy variable regressions indicate the existence of statistically significant average excess returns of TOM over ROM. The economic importance of the effect is manifested by a switching strategy (TOM+ Cash). The results show the switching strategy earns statistically significant risk-adjusted returns. Although outcomes may vary due to idiosyncratic characteristics of a particular year, the findings point to an easy and practical way to utilize the TOM effect.

The cause of the TOM effect, however, remains not fully understood. In addition, it is hard to explain the surprisingly high cumulative result for the whole test period from applying the buy-and-hold strategy on the CRSP equally-weighted index. The interesting "flip" of lower beta and higher returns in FF small caps begs further investigation. In brief, all the said issues in this paper present grounds for further research.

Reference List

Agrawal, A., Tandon, K., 1994, Anomalies or illusions? Evidence from stock markets in eighteen countries. Journal of International Money and Finance 13, 83-106.

Ariel, R., 1987, A monthly effect in stock returns. Journal of Financial Economics 18, 161-174.

Brown, P., and Kleidon, A., and Marsh, T., 1983, New evidence on the nature of size-related anomalies in stock prices. Journal of Financial Economics 12, 33-56.

Cadsby, Charles B., and Ratner, M., 1992, Turn-of-month and pre-holiday effect on stock returns: Some international evidence. Journal of Banking and Finance 16, 497-509.

Cataldo ll, A., and Savage, A., 2007, The January effect and other seasonal anomalies: a common theoretical framework. Emerald group publishing, UK.

Gopal, N., 2005, The significance of the turn of the month effect: revisited. MBA thesis paper: Master of Business Administration, Simon Fraser University.

Hensel, Chris R., and Ziemba, William T., 1996, Investment results from exploiting turn-of-the-month effects. The Journal of Portfolio Management 22.3, 17-23.

Kunkel, Robert A., and Compton, William S., 1998, A tax-free exploitation of the turn-of-the-month effect: C.R.E.F. Financial Services Review 7(1), 11-23.

Kunkel, Robert A., and Compton, William S., and Beyer S., 2003, The turn-of-the-month effect still lives: the international evidence. International Review of Financial Analysis 12, 207-221.

Keim, D., 1983, Size-related anomalies and stock return seasonality: further empirical evidence. Journal of Financial Economics 12, 13-32.

Lakonishok, J., and Smidt, S., 1988, Are seasonal anomalies real? A ninety year perspective. The Review of Financial Studies 1(4), 403-425.

Ogden, J., 1990, Turn-of-month evaluations of liquid profits and stock returns: a common explanation for the monthly and January effects. The Journal of Finance 45 (4), 1259-1272.

Pham, B., 2005, A monthly effect in stock returns: revisited. MBA Thesis paper: Master of Business Administration, Simon Fraser University.

Reinganum, M., 1983, The anomalous stock market behaviour of small firms in January, empirical tests for tax-loss selling effects. Journal of Financial Economics 12, 89-104.

Thaler, R., 1987, Seasonal movements in security prices 2: weekend, holiday, turn of the month, and intraday effects. Economic Perspectives 1(1), 169-177.

Westerfield, R., and Keim, D., and Jaffe, J., 1989, Earnings yields, market values, and stock returns. The Journal of Finance 44(1), 135-148.