

# **The Reversal of the Monday Effect in Canada and the US**

by

Sally Anne Cleary  
Bachelor of Laws, Queensland University of Technology 1995

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# APPROVAL

**Name:** Sally Anne Cleary  
**Degree:** Master of Business Administration  
**Title of Project:** The Reversal of the Monday Effect in Canada and the US

**Examining Committee:**

Robert G. Grauer  
Senior Supervisor  
Endowed University Professor

---

Daniel R. Smith  
Supervisor  
Assistant Professor

---

**Date Defended/Approved:** 20 April, 2005

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## **ABSTRACT**

This paper examines the Monday effect in US and Canadian equity markets and finds that: 1) the Monday effect in US and Canadian equity markets reversed during the period 1988 to 1998, and 2) there is a concentration of positive Monday returns during the first half of the month, i.e. the week-of-the-month distribution is more positive in the first and second Mondays of the month.

Keywords: Monday (weekend) effect; US and Canadian equity markets; reversal; concentration of Monday returns in first half of the month; week-of-the-month distribution.

## **DEDICATION**

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# 1 INTRODUCTION

Over the last twenty years, many papers have reported anomalies in the data on stock returns. By definition, “an anomaly is an occurrence that cannot be explained by the prevailing theory” (Pearce, 1991). For stock returns, anomalies occur with respect to the efficient markets theory that “predicts the absence of systematic patterns in stock returns that permit trading strategies to earn excess returns” (Pearce, 1991, pg 69).

Calendar stock return anomalies are among the most well known. The major calendar anomalies that have been identified by previous studies include higher average returns in January (the January effect), higher returns in the first half of months (the monthly effect), higher returns on days preceding national holidays (the pre-holiday effect), and lower returns on Mondays than other days (the Monday effect or the Weekend effect).

Since Fields (1931) first reported the effect, the presence of the Monday (or weekend) effect has been studied and predominantly reported for the US markets. Studies by Cross (1973), French (1980), Gibbons and Hess (1981) and Hindmarch (1984), reported significantly negative Monday returns. By contrast, there have been relatively few studies on the effect in Canada, although Bishara (1989) examined the effect on Canadian markets and found persistently negative returns for Monday during the period 1968 to 1987.

Since 1988, there has been an increasing number of studies, including those done by Brusa, Liu, Schulman (2000), Mehdian and Perry (2001) and Gu (2004), which suggest that the weekend effect has disappeared, and that returns over weekends have “switched” from being negative to positive. Furthermore, Mehdian and Perry (2001) and Brusa and Liu (2004) have shown that the reverse Monday effect is not evenly distributed, and in fact the first, second and third Mondays of the month have a significantly more positive return than the fourth and fifth Mondays of the Month.

The presence of the Monday effect, its subsequent reversal and the concentration of the reversal over weeks of the month are issues which hold keen interest to investors worldwide who hope to capitalize on potential market inefficiencies. Likewise, Canadian investors are interested in whether these effects studied in the US markets are mirrored in the Canadian market return data. To date, there has been a lack of research done on whether the Monday effect reversed in the Canadian market after the period 1988. Similarly, if positive Monday returns are concentrated unevenly during weeks of the month, that information could be valuable to Canadian investors.

In this paper we will examine two research questions:

1. Did the Monday effect reverse during the period 1988 to 1998 in the US and Canadian equity markets? And;

2. If so, was the reversal of the weekend effect during this period, evenly distributed across each week of the month or was the effect concentrated in certain weeks of the month? In particular, are the first and second Mondays of the month returns more positive than the third, fourth and fifth Monday returns, during this period?

This paper proceeds is organised as follows. In section 2 we present the methodology and data for investigating the Monday effect and questions and we set out the approach to testing our hypotheses. In section 3 we summarize the results and conclude the paper.

## 2 METHODOLOGY AND DATA

This section extends the research questions to develop testable hypotheses. It develops the methodology for investigating the Monday effect and its effect concentration during the pre-1988 and post-1988 periods in the US and Canadian equity markets. Section 2.1 discusses the theory for testable hypotheses. Section 2.2 sets out the approach to testing our hypotheses and provides an overview of our data.

Cross (1973), French (1980), Gibbons and Hess (1981) and Hindmarch (1984) found the presence of a significant negative Monday effect in the pre-1987 period. They found that stock prices tend to decline over weekends in the three-day interval from Friday's close to Monday's close. Rogalski (1984) found that the entire decline occurred between Friday's close and Monday's open. He found that the open-to-close returns on Mondays were non-negative. The study by Wang, Li and Erickson (1997) found that these significantly negative Monday returns were concentrated in the second half of the month and that the Monday's closing prices were insignificantly different from the previous Friday's close. In line with the findings from Cross (1973), French (1980), Gibbons and Hess (1981), Hindmarch (1984) and Wang, Li and Erickson (1997), we should expect a significant negative

Monday effect to be concentrated in the second half of the month. The following hypothesis is proposed.

**Hypothesis One: Monday returns are significantly negative in the second half of the month during the pre-1988 period.**

As had been reported by many others, Fortune (1998) found a negative Monday effect prior to the 1987 crash. However, contrary to his expected results, he found that since the 1987 crash, the Monday effect has switched from negative returns to positive returns. He explained that the cause of the switch from negative to positive was due to the investors' ignorance of subtleties about stock returns. Once made aware of anomalies through the data mining of financial economists, investors behave in ways that eliminate the newfound anomaly. The work by Brusa, Liu and Schulman (2001), Mehdian and Perry (2001) together with Gu (2004) also found that the Monday effect had reversed during the post-1988 period, concluding that there is no support for the continuation of negative returns over weekends.

In addition, there has been increasing evidence to suggest that Monday returns differ on a week-of-the month basis, although the evidence so far had been mixed. Liano and Lindley (1995) reported that negative Monday returns were mainly concentrated in the second half of the month, and Wang, Li and Erickson (1997) found that the effect existed only in the fourth and fifth week of the month. Mehdian and Perry (2001) and Brusa and Liu (2004), on the other hand, found that the Monday effect was primarily

reversed in the first three weeks of the month. While the evidence for the distribution of the Monday effect reversal has been mixed, we can be certain that there is no support for the continuation of negative returns over weekends during the post-1988 period. The following hypothesis is proposed.

**Hypothesis Two: The Monday effect has reversed during the post-1988 period (i.e. the Monday effect has switched from negative returns to positive returns).**

The two hypotheses will be tested by examining the differences in the average Monday returns. Monday return is computed using the natural logarithm of Monday closing price over the previous Friday close, i.e.

$$LN\left(\frac{P_{Mon}}{P_{Fri}}\right)$$

where  $P_{Mon}$  and  $P_{Fri}$  is the closing price of the market index on

Monday and Friday respectively. The data of daily stock prices for US and Canadian equity markets is sourced from CRSP database via the university's library website. Three sets of sample for the daily stock prices are extracted using the S&P 500, CRSP V-W and TSE 300 indices from 1973 to 1998. Each set of sample is selected based on the following criteria: (1) should the stock market closes operations on Friday, the previous day closing price, i.e. Thursday, is adopted and; (2) if the stock market closes operations on Monday, that week of the month is automatically excluded in our analysis. Our selection criteria retain 1256 and 1030 observations for the Monday returns available for our empirical analysis on the US and Canadian stock market respectively.

### 3 RESULTS

Table 1 shows average Monday returns by the week-of-the-month for the S&P500, CRSP VW and TSE 300. The results in Table 1 indicate that the average Monday returns of the three indices have been consistently negative for all the weeks of the month and that the Monday effect is highly significant at the fourth and fifth week of the month, i.e. they are concentrated in the second half of the month. These results suggest that the Monday effect found in the US equity market is mirrored in that of the Canadian equity market. Our findings are consistent with the article by Wang, Li and Erickson (1997), who also found significantly negative Monday returns in the second half of the month.

In contrast, the results for the post-1988 sub-period in Table 1 are shown quite differently from those for the pre-1988 sub-period. During the post-1988 sub-period, positive Monday returns for the US and Canadian equity markets are mostly concentrated in the first two weeks of the month, indicating a reversal of the Monday effect. In addition, these positive average returns are found to be significantly different with those in the pre-1988 period.

However, the reversal of the Monday effect does not hold true for the third, fourth and fifth weeks of the month during the post-1988 period, which

we still find negative average returns. Our results have contributed more evidence to the current literature to suggest that returns on Monday differ on a week-of-the-month basis. Our finding is consistent with Liano and Lindley (1995), who have also found negative Monday returns to be concentrated in the second half of the month.

Table 1 also incorporates a Two-Sample T Test. Weeks one and two are grouped together in sub set A and weeks three, four and five are grouped together in sub set B. The results of this test appear to statistically confirm the conclusion that weeks one and two have a higher concentration of positive returns than weeks three, four and five. In particular, the first Mondays of the month returns tend to be more positive than the second Mondays.

Our finding is almost identical with that of the articles by Mehdian and Perry (2001) and Brusa and Liu (2004) whose papers found significantly positive Monday returns in the first three weeks of the month. Interestingly, the reversal of the Monday effect in both US and Canadian equity markets has discontinued after the second week of the month, indicating an absence of systematic patterns in stock returns in the post-1988 sub-period that will permit trading strategies to earn excess returns. In other words, an investor who buys a US and/or Canadian index fund at the second half of the month is potentially able to earn an arbitrage profit by selling the fund at the first week of the month, where returns are significantly at their highest



**Table 1: Average Monday Returns by the Week-of-the-Month**

This table displays the average Monday returns by the week-of-the-month for S&P 500 index, CRSP Value Weighted index and TSE 300. The study period for S&P 500 and CRSP V-W indices is from January 1973 to December 1998; the study period for TSE 300 is from January 1977 to December 1998. DIF refers to the differences in average Monday returns between two sub-periods: pre- and post 1998. TTest refers to the t-statistics testing the significance for DIF. The Two-Sample TTest compares the mean returns of weeks 1 and 2 with weeks 3,4 and 5. DoF is the degrees of freedom

Indices	Entire Period			Pre-1988			Post-1988				
	Avg Ret	T-stat	OBS	Avg Ret	T-stat	OBS	Avg Ret	T-stat	OBS	DIF	TTest
<b>All Weeks</b>											
S&P 500	-0.0354	-1.033	1256	-0.0792	-2.065	727	0.0438	1.610	529	-0.002	-1.8779
CRSP VW	-0.0634	-2.096	1256	-0.1557	-4.668	727	0.0634	2.543	529	-0.002	-3.7601
TSE 300	-0.0838	3.210	1029	-0.1741	-3.121	516	0.0706	1.109	513	-0.002	-3.1770
<b>Week 1</b>											
S&P 500	0.0653	1.066	272	-0.0730	-0.873	158	0.2570	2.992	114	-0.004	-2.7545
CRSP VW	0.0472	0.823	272	-0.0775	-0.994	158	0.2199	2.716	114	-0.003	-2.6470
TSE 300	0.0693	1.258	201	-0.0103	-0.131	101	0.1497	1.950	100	-0.002	-1.4602
<b>Week 2</b>											
S&P 500	0.0880	1.673	312	-0.0349	-0.447	180	0.2557	4.167	132	-0.003	-2.9267
CRSP VW	0.0481	0.990	312	-0.0626	-0.863	180	0.1991	3.584	132	-0.003	-1.4940
TSE 300	-0.0283	-0.622	243	-0.1035	-1.397	122	0.0475	0.920	121	-0.002	-1.6655
<b>Week 3</b>											
S&P 500	-0.1065	-1.111	285	-0.1772	-1.137	165	-0.0092	-0.121	120	-0.001	-0.9693
CRSP VW	-0.1296	-1.679	285	-0.1896	-1.533	165	-0.0470	-0.696	120	-0.001	1.6790
TSE 300	-0.1687	-2.509	251	-0.2850	-2.397	125	-0.0533	-0.863	126	-0.002	-1.7295
<b>Week 4</b>											
S&P 500	-0.1451	-2.075	288	-0.2100	-2.202	166	-0.0567	-0.559	122	-0.001	-1.4390
CRSP VW	-0.1765	-2.725	288	-0.2385	-2.661	166	-0.0922	-1.005	122	-0.001	-2.5700
TSE 300	-0.1784	-2.677	243	-0.2579	-2.516	123	-0.0970	-1.153	120	-0.001	-1.2140
<b>Week 5</b>											
S&P 500	-0.1778	-1.482	99	-0.3043	-2.397	58	0.0010	0.004	41	-0.002	-0.2454
CRSP VW	-0.1993	-1.766	99	-0.3245	-2.677	58	-0.0221	-0.106	41	-0.002	-0.6930
TSE 300	-0.0835	-0.907	91	-0.1969	-1.765	45	0.0275	0.190	46	-0.003	-1.2326
<b>2-Smpl TT</b>											
S&P 500	2109	3.157	583	.1573	0.676	337	.2831	3.487	245		
CRSP VW	2076	3.507	583	.1831	1.875	337	.1921	3.631	245		
TSE 300	.1752	3.175	443	.3212	2.277	222	.1673	2.285	220		

## 4 CONCLUSION

The anomaly of stock returns has always been a topical issue among academics and practitioners. Over the last twenty years, many articles have reported anomalies in the data of stock returns, of which calendar stock return anomalies such as the January effect, monthly effect, pre-holiday effect and the Monday effect, are among the most well known.

The research question of this study is to examine the Monday effect during the period 1973 to 1998 in the US and Canadian equity markets. Mehdian and Perry (2001) showed that positive Monday returns began to appear in broad market indices from 1988. Thus, based on literature survey, we divide the study period into pre and post 1988 sub-periods. This study extends the research question and develops the following two testable hypotheses.

*Hypothesis One: Monday returns are significantly negative in the second half of the month during the pre-1988 period.*

*Hypothesis Two: The Monday effect has reversed during the post-1988 period (i.e. the Monday effect has switched from negative returns to positive returns).*

Both hypotheses were tested using statistical analysis by examining the significance of US and Canadian stock returns at each particular week-of-the month. Our tests reveal three major findings.

First, we found evidence in favour of our first hypothesis that Monday returns are significantly negative in the second half of the month during the pre-1988 period. The Monday returns in the fourth and fifth week of the month are significantly lower than those in the first, second and third week. This finding is consistent with the article by Wang, Li and Erickson (1997).

Second, there is some empirical support in favour of our second hypothesis that the Monday effect has reversed in the US and Canadian equity markets after 1988. The reversal of the Monday effect is concentrated on the first and second Mondays of the month. In particular, the first Mondays of the month returns tend to more positive than the second Mondays. Our finding is almost consistent with that of the articles by Mehdian and Perry (2001) who also found significantly positive Mondays in the first three weeks of the month.

Third, the reversal of the Monday effect has discontinued after the second week of the month during the post-1988 period. Using information based on historical data for stock returns, our finding suggests that the reversal of the Monday effect will give rise to an opportunity for investors to develop trading strategies to earn excess stock returns.

A possible reason to explain the anomaly of the stock returns on Mondays is futures trading. Kamara (1997) examined the issue and found institutional

futures trading post 1988 may help explain these anomalies. Another possible explanation may be that the market is informationally inefficient. The basic idea underlying the efficient market is that informed investors earn a sufficient amount to just compensate for the cost of information gathering. High expenses do not necessarily imply inferior performance, even after expenses have been deducted, indicating that there should not be a relationship between expenses and performance. Grossman and Stiglitz (1980) view concerning efficient markets has been extensively addressed internationally, where the empirical evidence widely documents that markets are informational inefficient. Elton, Gruber, Das and Hlavka (1993) examined the market efficiency of the US equity, bond and small firm indices. The authors showed that there is a negative relationship between performance of funds and their trading expenses (i.e. high trading expenses such as expense ratios, management fees and turnover generate low stock return), indicating that markets are information inefficient.

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