

THE MONTHLY EFFECT IN INTERNATIONAL STOCK MARKETS: EVIDENCE AND IMPLICATIONS

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Abstract

A monthly effect has been reported in several international stock markets. This study investigated seven countries' stock markets that have not been studied thoroughly. Three of the seven countries' markets had a monthly effect. An inverted monthly effect was found in a Pacific basin market. It was also determined that the January effect, although significant, was not capable of explaining the presence of monthly effect where they exist.

INTRODUCTION

Capital market efficiency has been a popular topic for teaching and empirical research since Fama [3, 4] described the theoretical analysis of market efficiency (Efficient Market Hypotheses). Subsequent to the Fama studies a great deal of research was devoted to investigating the randomness of stock price movements for the purpose of demonstrating the efficiency of capital markets. More recently, however researchers have demonstrated market inefficiency by identifying systematic variations in stock returns. Some of the more important systematic variations, or anomalies as they are referred to are Value Line's investment recommendations, the small firm effect and extra-ordinary returns related to the time or the calendar effect.

The existence of calendar or time anomalies is a contradiction to the weak form of the Efficient Market Hypothesis (EMH). The weak form of the EMH states that the market is efficient in past price and volume information and stock movements cannot be predicted using this historic information. This form infers that stock returns are time invariant, that is, there is no identifiable short-term time based pattern. The existence of seasonality or monthly effects in domestic and international markets suggests a market inefficiency, in that investors should be able to earn abnormal rates of return incommensurate with the degree of risk. For a complete explanation of the characteristics of each efficient market form see any modern investments text (Francis 1993).

The purpose of this study is to investigate the existence of a monthly pattern or monthly effect in investment returns for seven different countries' stock market indexes. In this study the investigation of the monthly effect is extended by examining the return patterns of markets that have not been thoroughly investigated. The countries being studied are Denmark, France, Germany, Norway, Singapore/Malaysia, Spain and Switzerland. The results of this study and others like it should have important implications for financial managers, financial counselors and investors interested in international diversification. Its relevance lies in the direct bearing of its results on the timing and nature of investment decisions.

PRIOR RESEARCH

Studies in time efficiency have found seasonality (January Effect), day of the week effect and intra-monthly patterns in both domestic markets and international markets. In the United States, stock returns in the first month of the year have been statistically different (larger) from the other months (Rozeff and Kinney 1976). Some

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excellent studies have been performed, and seasonal influences found, in specific international markets: in Australian markets (Officer 1975); in Italian capital markets (Barone 1990); evidence in the United Kingdom (Lewis 1989); in Canadian stock prices (Tinic, Barone-Adesi and West 1990) and in the Tokyo Stock Exchange (Aggarwal, Rao and Hiraki 1990). Significant seasonality in major industrial foreign countries were found using both non-parametric and parametric tests (Gultekin and Gultekin 1983).

Additionally, empirical investigations have provided convincing evidence that there are day-of-the-week (week-end effect) effects in United States stock returns. Mondays average returns have been found to be negative (Smirlock and Starks 1986). A week-end effect in the return distributions of several foreign countries was also identified (Jaffe and Westerfield 1985). Studies have also been done to determine if there is an intra-monthly anomaly. Ariel [2] documents a monthly pattern in United States stock index returns. Stocks were found to earn a positive average return in the beginning and during the first half of calendar months and zero average returns during the second half. A weak monthly effect has also been observed in foreign countries (Jaffe and Westerfield 1989). Australia, United Kingdom and Canada had patterns consistent with Ariel's findings in the United States. Japan, however, had a inverse effect. There remains a need in our fast changing global economy for a study of the monthly effect for international markets for which analyses are incomplete.

METHODOLOGY AND RESULTS

Seasonality as well as the monthly effect is more easily detected in market indexes or large stock portfolios than in individual share prices (Officer 1975). Stock market returns in this study are computed from the indexes reported by Morgan Stanley Capital International Perspective (CIP). CIP is published by Capital International, S.A., headquartered in Geneva, Switzerland. These indexes are performance measurement bench marks for global stock markets and are generally accepted performance measurements. The CIP indexes represent approximately 65 percent of the total market value of all shares traded in the countries.

CIP indexes are market-weighted averages without dividends yields. They report closing prices in local currencies. The weighing scheme of an index may effect the results of empirical studies. Analysis performed with data that uses equal weights indicate statistically significant seasonality in U.S. capital markets (Rozeff and Kinney 1976). Equal weighing schemes place a greater weight on small firms than a market weighted approach. Considerable analyses have been performed to investigate the inverse relationship between firm size and stock returns. Domestic studies have linked much of the January effect to the small firm (Kiem 1983). International studies have found that small firms achieve higher rates of return than large companies, with this effect being particularly evident in the month of January (Aggarwal, Rao and Hiraki 1990). For distinguished work on the "January Effect" see Tinic & West [16]. Therefore, utilization of an equal-weighing index in performing statistical analyses will magnify anomalies related to small firms.

In the following analysis it is assumed that stock prices or returns within each yearly account follow a geometrical random walk, that is:

Equation 1

$$\text{Return}_t = \ln (\text{Index}_t / \text{Index}_{t-1}) = a + u_t$$

where:

Return_t is the continuously compounded rate of change in the stock index. Index_t is the stock market index at time t , a is a constant value and u_t is a normal random variable with a mean of zero. This of course implies that the average rate of change of a stock index is equal for every month of the year.

The sample parameters are the CIP reported index values for the time periods studied covering the period from March 4, 1978 through December 30 1992, reported in local currencies for the seven countries. The returns are computed as percent change in the price index. Letting $P_{i,t}$ denote the price index of stock i at time t , then:

Equation 2

$$R_{i,t} = (P_{i,t}) - (P_{i,t-1}) * (1 / P_{i,t-1})$$

where:

$P_{i,t}$ is the price of the i th index at time t . In the calculation of returns, t represents two distinct time periods, t_1 is the index value after the first four trading days and t_2 is the second to last trading day of the month. To allow comparison with Ariel [2] and Jaffe and Westerfield's [9] work, the last trading day of each month is included in the next month's return. Only five days were used to capture the early month returns because past research has found that the monthly effect is traceable to large returns occurring very early in the month.

Table 1 shows the average returns for the two time periods studied and for each country. The monthly effect means that the returns are larger in the beginning of the month than for the middle or end of the month. The results indicate a monthly effect similar to that found in previous research. Average returns were largest for t_1 for all of the countries except for Singapore/Malaysia which was reversed. Jaffe and Westerfield [9] had found a reversed monthly effect for another Pacific basin market, Japan. A paired t-test is used to test if there is a difference in mean returns. The null hypothesis of the monthly effect is:

$$H_0: t_1 = t_2$$

or the returns for the five day period representing the beginning of the month is equal to the returns of the rest of the month.

$$H_A: t_1 \neq t_2$$

A positive monthly return was found to exist at the .05 level of significance in the Denmark, Germany and Norway stock markets. A significant negative effect was found in the Singapore/Malaysia market at the .01 level.

TABLE 1
Difference In Means

	Average Return Beginning Of Month	Average Return Remaining Of Month	Paired t-Statistic
Denmark	1.0232 (4.136)	.1363 (4.182)	1.97*
France	.8974 (3.892)	.0823 (4.013)	1.52
Germany	1.3613 (4.117)	.2348 (3.392)	2.11*
Norway	1.0061 (4.112)	.1222 (4.086)	1.99*
Sin/Mal	.0451 (2.913)	1.0120 (2.672)	-2.41**
Spain	.9133 (3.114)	.2716 (3.022)	1.61
Switzerland	1.0107 (3.641)	.3416 (3.717)	1.43

*Significant at the .05 level.

**Significant at the .01 level.

The monthly effect is also tested using a regression model similar to that used by Jaffe and Westerfield (1989):

Equation 3

$$R_t - \rho R_{t-1} = a(1-\rho) + B(D_t - \rho D_{t-1}) + e_t$$

where:

R_t is the stock index return, D_t is a dummy variable taking the value of 1 for t_1 and 0 for t_2 . Because stock index returns are serially correlated the regression equation takes the first difference and ρ is the first order serial correlation coefficient of the error terms. The procedure is the Cochrane-Orcutt method. The regression model tests the difference between mean returns for the beginning of the month and at the end of the month. A second regression model was estimated adding the middle of the month in addition to the end of the month (both were given zeroes as the dummy variables) but the results were consistent with the first regression model so it is not reported. The related statistics and the coefficient t values are presented in Table 2. The results are consistent with those in Table 1. A monthly effect is present in the same markets and Singapore/Malaysia had a inverse monthly effect.

TABLE 2
Regression Model To Test Difference In Means

	ρ	α	B	Total RSQ	Regression RSQ
Denmark	.216	.00018	.00095 (1.941)*	.0036	.0721
France	.281	.000023	.00083 (1.583)	.0028	.1231
Germany	.231	.00011	.00101 (2.117)*	.0018	.0823
Norway	.225	.00026	.00162 (1.821)*	.0031	.0141
Sin/Mal	.118	.00021	-.00032 (-2.361)**	.0008	.0117
Spain	.127	.00017	.00039 (1.543)	.0011	.0237
Switzerland	.134	.00032	.00082 (1.52)	.0009	.0234

t-statistics are reported in parentheses

*Significant at the .05 level

**Significant at the .01 level

The question remains as to whether the presence of a monthly effect is either confounded or manifested by the January effect. The overall large early month returns may be do to the excess returns earned in January. It is well documented that much of the January effect is traceable to large returns occurring early in the month (Keim 1983, Reinganum 1983). To test whether the monthly effect is no more than the January effect, return patterns were examined with January excluded. Results of the analysis are shown in Table 3. The mean overall returns for all markets were diminished, as expected. However, a positive monthly effect was still present and significant at the .05 level in the German and Danish markets but not the Norway market. The paired t, again was the appropriate

test. The Singapore/Malaysia market, again, exhibited a significant negative effect (at .01) although the January effect was a significant component of the overall monthly effects, the remaining monthly effect in two markets which had significant overall monthly effects was still significant even with January observations removed.

TABLE 3
Difference In Means
January Excluded

	Average Return Beginning Of Month	Average Return Remaining Of Month	Paired t-Statistic
Denmark	.9771 (3.993)	.2341 (3.893)	1.88*
France	.8115 (3.164)	.0992 (3.885)	1.77
Germany	1.1120 (3.998)	.3083 (4.002)	2.21*
Norway	.9921 (3.897)	.0833 (3.653)	1.88*
Sin/Mal	.0452 (2.887)	1.001 (2.441)	-2.21**
Spain	.8124 (3.006)	.3550 (2.985)	1.55
Switzerland	1.0100 (3.212)	.3412 (3.440)	1.93*

*Significant at the .05 level.

**Significant at the .01 level.

Possible explanations for the monthly effect include the dividend effect, economic and political announcements dates concentrated in one part of the month and large market declines occurred during late October of the study period. However, previous research has found a monthly effect for a time period that excluded 1987's crash. Further analysis of these and other markets is warranted.

SUMMARY AND CONCLUSIONS

It is well documented that there is a week-end effect, a January effect and a monthly effect in U.S. stocks. There is strong evidence of a week-end effect and a January effect in foreign stock markets. Australia and Canada were found to have significant positive monthly effects, while Japan's market had a negative monthly effect. This research extended Jaffe and Westerfield's results by investigating the monthly effect in markets in Denmark, France, Germany, Norway, Singapore/Malaysia, Spain and Switzerland. An end of the month effect was found in the Danish, Norwegian and German markets. An inverted (negative effect) was found in the Pacific basin market of Singapore/Malaysia. It was also determined that the January effect, although significant, was not capable of explaining the presence of monthly effects were they exist.

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