

Vesna Karadžić*
and Tamara Backović Vulić**

THE MONTENEGRIN CAPITAL MARKET: CALENDAR ANOMALIES

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ABSTRACT: *Many researchers have shown that capital markets in CEE countries are weakly efficient in terms of calendar anomalies. The goal of this paper is to investigate whether the capital market in Montenegro is efficient regarding some of these anomalies. The main characteristics of the Montenegrin capital market are briefly explained. The empirical analysis is done on the daily values data of stock market index NEX20. An investigation of the January effect is implemented with the graphical representation of the rate of return for all the months of the seven-year period and by estimation of a regression model of return on index NEX20. The intercept represents the value of the return in January and it is insignificant.*

The holiday effect, tested by graphical representation for the Statehood Day data, was not present in the whole period. To investigate the turn-of-the-month effect we employed the graphical representation and regression model of the return rate on index NEX20 for the last week of every month and for the rest of the month. The value of the intercept, representing return for the last week of the month, is significant. The absence of some tested calendar anomalies suggests that the Montenegrin capital market is becoming more efficient.

KEY WORDS: *efficient capital market, calendar anomalies, the January effect, the turn-of-the-month effect, the holiday effect*

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* Faculty of Economics, University of Montenegro; vesnaka@ac.me

** Faculty of Economics, University of Montenegro; tbackovic@gmail.com

1. THE CAPITAL MARKET IN MONTENEGRO

The development of the capital market in Montenegro started in 2001. This was the time when the mass voucher privatization of state-owned companies was still in the process of being completed. The main precondition for capital market development in Montenegro was the foundation of a stock exchange.

The Montenegro Stock Exchange was established in June 1993, on the basis of the Law on Money and the Capital Market. In July 1995 the Montenegro Stock Exchange harmonized its business activities in compliance with the Law on Stock Exchange, Stock Exchange Activities and Agents. The Montenegro Stock Exchange obtained a founding license from the Federal Ministry of Finance, a license for trading with short term securities from the Yugoslav Central Bank, and a license for trading with long term securities from the Federal Securities Commission.

Since September 2006 the Montenegro Stock Exchange has been an entirely privately owned company, due to the fact that the Government of Montenegro sold its 5% stake in the Montenegro Stock Exchange by auction sale on the stock market. For this package the price was €1,100 per share, or five times more than the nominal value, representing a market capitalization of the Stock Exchange of €1.4 million.

Even though the first stock exchange in Montenegro was founded in 1993, the first trade with long term securities was realized only after Parliament passed the Law on Securities in 2002. The Law on Securities regulates the terms and conditions for issuance, public offering, and trading of securities, the rights and obligations of participants in the securities market, and the organization, scope, and powers of the Securities Commission.

The New Montenegrin Stock Exchange (NEX Montenegro) Podgorica was founded in September 2001. It was given work authorization in November 2001 by the Montenegrin Securities Commission.

The NEX Montenegro Stock Exchange calculated two indexes, NEX20 and NEXPIF. The index of the NEX Montenegro Stock Exchange, NEX20, consisted of 20 issuers' share, determined on the basis of market capitalization, turnover, and number of concluded transactions. The start value of the stock index was 1,000 stock market points. The basic goal of calculating and publishing the index

of the Securities Exchange NEX Montenegro was to provide the public with information on movements in certain segments of the market.

Until the end of 2010 Montenegro has had two stock exchanges, Montenegro Stock Exchange and NEX Montenegro Stock Exchange. In January 2010 stockholders in NEX approved a merger with the Montenegro Stock Exchange, initially expected to take place within two to three months. However, the two were technically merged on December 31, 2010, and their systems have been jointly operating since January 10, 2011. The merger consolidated and simplified securities trading in Montenegro.

After the merger with NEX Montenegro was established the principal stock exchange indexes became MONEX20 and MONEXPIF. The starting value of the MONEX20 index on January 1, 2011 was 14,522.53 stock market points, and the same value for the MONEXPIF index was 6,595.82 stock market points.

The Securities Commission Montenegro (SCM) is the market regulator. The SCM was founded in 2000 and it took over the jurisdiction from the Yugoslav Federal Commission for Securities and Financial Markets. The SCM has the authority to enact implementing provisions to the Law on Securities, to approve and supervise public offers of securities, to license and supervise security market participants, to authorize and regulate collective investment schemes, to regulate the manner and scope of the trading in the securities market, and to regulate takeovers.

According to the Securities Law, trading of securities can be performed only at the official stock exchanges; therefore no Over The Counter (OTC) market exists in Montenegro.

The bond market in Montenegro is limited to issuing T-bonds and T-bills by the Central Bank of Montenegro and therefore it is undeveloped. It can be concluded that the capital market in Montenegro is actually the stock market.

2. CALENDAR ANOMALIES

For almost ten years after the publication of Fama's classic exposition in 1970, the Efficient Markets Hypothesis (EMH) dominated the academic and business scene. According to this hypothesis the market is efficient if its prices are formed on the basis of all disposable information. One stock market is efficient only if all

relevant information about the company are incorporated in its the stock price. But soon critics of EMH produced a wide range of arguments.

The assumption that investors are rational and therefore value investments rationally – that is, by calculating the net present values of future cash flows, appropriately discounted for risk – has not been supported by empirical evidence. Rather the evidence shows that investors are affected by herd instinct, a tendency to “churn” their portfolios, and a tendency to under-react or over-react to news or asymmetrical judgements about the causes of previous profits and losses.

Furthermore, many alleged anomalies have been detected in the patterns of historical share prices. The best known are calendar anomalies.

There is evidence that abnormal equity returns are associated with the turn of the year, the week, and the month, as well as with holidays and the time of day. These returns are not unique to one historical period, nor can they be explained by considerations of risk or value. Tax-loss selling at year-end, cash flows at month-end, and negative news releases over the weekend may explain some of these return abnormalities. But human psychology offers a more promising explanation. Calendar anomalies tend to occur at turning points in time. While these artificial moments have little economic significance, investors may deem them important, and behave accordingly. The question remains why these effects, which have been recognized for some years, have not been arbitrated away. Trading costs are, of course, an impediment. A portfolio manager would not consider liquidating an entire portfolio on a Friday merely in order to avoid experiencing relatively poor weekend returns. However, planned trades can be scheduled to take advantage of calendar-based return patterns. Calendar effects should be of particular importance to traders.

The January effect, the holiday effect and the the Turn-of-the-month effect for the Montenegrin capital market will be tested and presented in the following sections of the paper.

2.1 The January effect

The month of January in the stock market has strong significance in predicting the trend of the stock market for the rest of the calendar year. This phenomena occurs between the last trading day in December of the previous year and the fifth trading day of the new year in January. The January effect is a result of tax-loss selling which causes investors to sell their losing positions at the end of

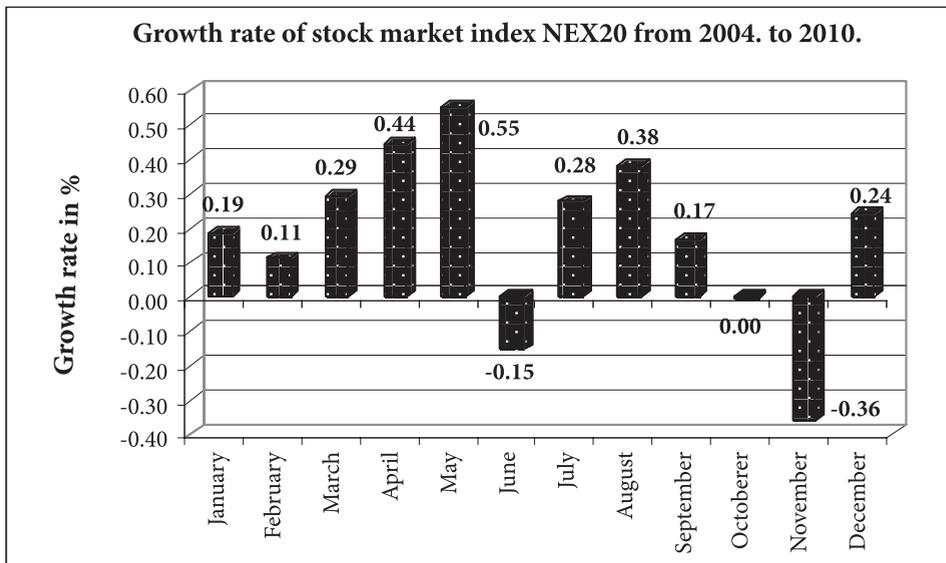
December. Therefore, the main characteristic of the January effect is an increase in buying securities before the end of the year at a lower price, in order to sell them in January to generate profit from the price differences.

For example, after discovering the January effect, investors who expect the stock price to appreciate in January will then purchase before January and sell at the end of January. This will drive up the stock prices before January and push down the prices at the end of January, resulting in the diminishing or even disappearance of the January effect.

The January effect has been observed in many countries. Gultekin and Gultekin (1983) investigated the January effect in seventeen major industrialized countries and found unusually high January returns in most of the countries studied (specifically, Australia, Belgium, Canada, Denmark, Germany, Japan, Netherlands, Norway, Spain, Sweden, and Switzerland).

The growth rate of Montenegrin stock exchange index NEX20 for all the months of the year during the seven year period 2004-2010 was analyzed and the results are presented in the following graph.

Graph 1: NEX20 index growth rate in the months of the year, 2004 – 2010



Source: authors' calculation

According to these results, the growth rate of the NEX20 index does not have the highest value during January. The highest growth rate of the stock exchange index was realized in May with 0.55% of change, while in January the value of growth rate was only 0.19%. Therefore the January effect is not present in the Montenegrin capital market.

The next step is to test the statistical significance of the previous conclusion about the January effect on the Montenegrin capital market. To construct the test for specific calendar anomalies, it is necessary to create the series according to the following formula:

$$R_t \equiv \log P_t - \log P_{t-1} \quad (1)$$

where P_t denotes the closing price of the index on day t . The expected return and the variance of R_t are denoted by $\mu_t \equiv E(R_t)$ and $\equiv \text{Var}(R_t)$, and it is also assumed that the sequence of returns are uncorrelated between dates t and s , for all $t \neq s$ or $\text{Cov}(R_t, R_s) = 0$.

Donald B. Keim (1983) suggested a regression model with dummy variables as a method of testing the January effect. It takes the following form:

$$R_t = a + \sum_{i=2}^{12} b_i D_i + e \quad (2)$$

where D_t represents monthly dummy variables defined as follows: D_2 is 1 for February and 0 for other months, D_3 is 1 for March and 0 for other months, and so on, and e is the error term. The intercept constant a represents the average January return since January is represented by the situation when each of 11 dummy variables is equal to 0. The expected return for February is equal to $a+b_2$. If the dummy variable coefficients all are negative, it indicates that the January return is the largest; i.e., it is consistent with the January effect. If the dummy variable coefficient is positive, it indicates that the given month's return is greater than the January return. Test results of the January effect for the NEX20 stock exchange index are as follows:

MONTENEGRIN CAPITAL MARKET: CALENDAR ANOMALIES

Dependent Variable: RTNEX20				
Method: Least Squares				
Sample (adjusted): 3/04/2003 12/31/2010				
Included observations: 2044 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000766	0.000637	1.202123	0.2295
D2	-7.39E-05	0.000922	-0.080223	0.9361
D3	0.000230	0.000871	0.264091	0.7917
D4	0.000374	0.000877	0.426872	0.6695
D5	0.000448	0.000874	0.512474	0.6084
D6	-0.001337	0.000876	-1.525798	0.1272
D7	6.23E-05	0.000871	0.071453	0.9430
D8	0.000836	0.000873	0.958136	0.3381
D9	-0.000275	0.000876	-0.313836	0.7537
D10	-0.000668	0.000873	-0.765272	0.4442
D11	-0.002380	0.000878	-2.708874	0.0068
D12	0.000382	0.000869	0.439652	0.6602
F-statistic	2.193090	Prob(F-statistic)	0.012587	

For the Montenegrin capital market, almost all estimated dummy variable coefficients are positive and almost none of them are statistically significant. The intercept is positive too, but it is not the coefficient with the highest value and it is not statistically significant. The results, therefore, are not consistent with the January effect.

Since statistical significance for the intercept was not achieved in the last model estimation, the next step should be an estimation of the same model but for two or more sub-samples. Taking into account that the world financial crisis occurred in 2008, we decided to create two sub-samples: one containing the data for the 2003-2007 period before the crisis, and one with data from the 2008-2010 period during the crisis.

The estimated model for the period from 2003 to the end of 2007 is given in the next table.

Dependent Variable: RT				
Method: Least Squares				
Sample (adjusted): 3/04/2003 12/31/2007				
Included observations: 1260 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001541	0.000790	1.949843	0.0514
D2	0.000249	0.001145	0.217506	0.8278
D3	0.001072	0.001058	1.013388	0.3111
D4	0.000301	0.001069	0.281401	0.7784
D5	-0.000613	0.001058	-0.579658	0.5623
D6	-0.001469	0.001065	-1.380037	0.1678
D7	-0.000790	0.001063	-0.743504	0.4573
D8	0.000802	0.001056	0.759759	0.4475
D9	-0.000514	0.001067	-0.481903	0.6300
D10	0.000563	0.001060	0.530635	0.5958
D11	-0.002755	0.001065	-2.587746	0.0098
D12	-0.000593	0.001060	-0.559002	0.5763
F-statistic	2.227302	Prob(F-statistic)	0.010335	

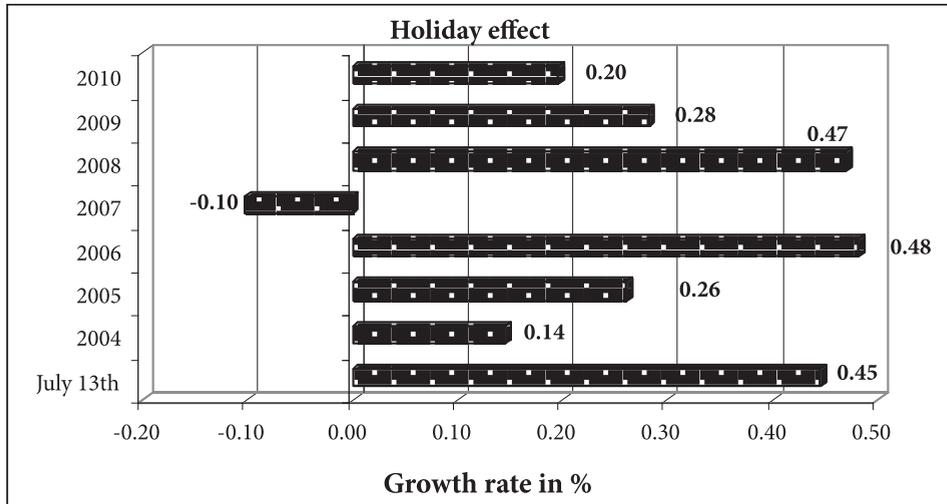
It is clear that the January effect was present in the capital market in Montenegro in the pre-crisis period. The intercept coefficient is positive and has the highest value compared to the dummy variable coefficients. It is statistically significant at the 10% level. The whole model is statistically significant at the 10% level.

The estimated model for the post-crisis period is almost the same as the model for the whole period. The January effect is not present, the intercept coefficient as well as the whole model is not statistically significant.

2.2 The Holiday effect

The *holiday effect* refers to the tendency of the market to do well on any day which precedes a holiday. It means that participants in the capital market are much more optimistic before holidays and that the growth rate of stock prices is higher in that period compared to those after holidays.

To investigate the holiday effect on the capital market in Montenegro we have chosen July 13th, Statehood Day. The results are given in the graph below.

Graph 2: Holiday effect on the Montenegrin capital market

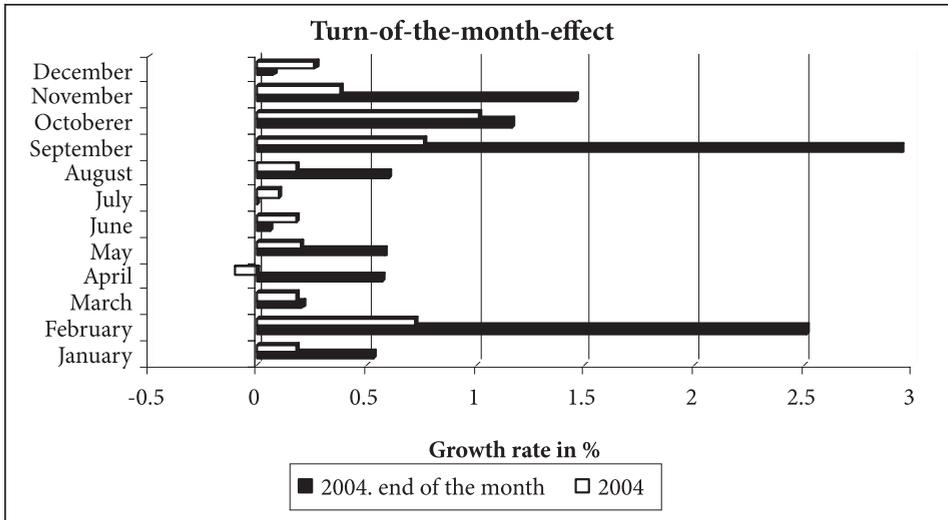
The stock exchange index NEX20 growth rate values one week prior and two weeks after the July 13th holiday were analysed for the 2004-2010 period. The results show that the growth rate one week before the July 13th holiday has a value of 0.45%, but it is not the highest growth rate within the analyzed period. The holiday effect has no significant impact on the capital market in Montenegro. The highest growth rate of index NEX20 was realized in July 2006.

2.3 Turn-of-the-month effect

The turn-of-the-month effect is the tendency of stock prices to increase during the last two days and the first three days of each month. Some researchers ascribe the effect to the timing of monthly cash flows received by pension funds and reinvested in the stock market. Using the data of the Dow Jones Industrial Average (DJIA) index for the period 1897-1986, Lakonishok and Smidt (1988) found that the mean return on turn-of-the-month trading days is about eight times higher than on other trading days.

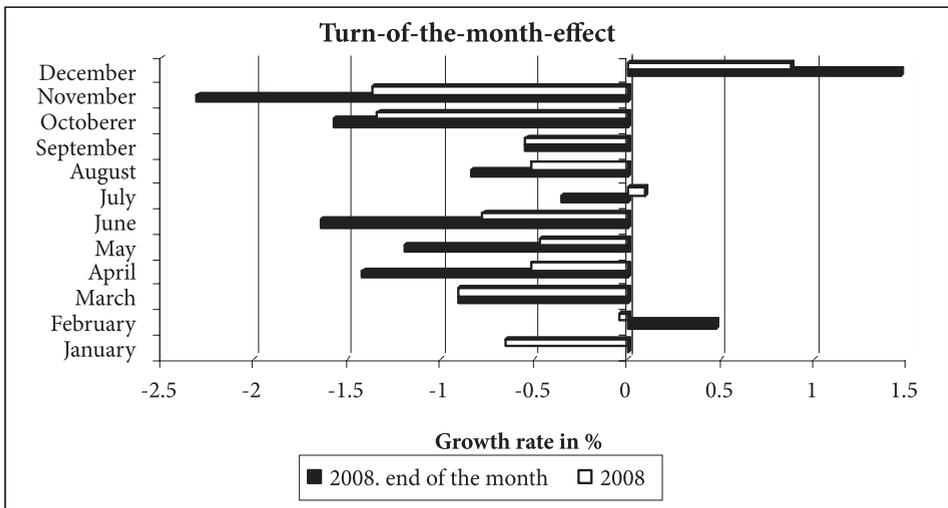
To analyze the turn-of-the-month effect two years are chosen, 2004 and 2008. 2004 is the year with the highest value of trade turnover, because the citizens in Montenegro actively started to participate in the capital market. 2008 is the year when the world financial crisis began, which is the reason for choosing this year. The results are illustrated in Graph 3.

Graph 3: Turn-of-the-month effect on the Montenegrin capital market in 2004.



The red bar in the graph represents the monthly growth rate of the NEX20 index for the last week of the month. The yellow bar is the growth rate for the whole month. The results show that the turn-of-the-month effect is partly present. This effect is significant in all the months of 2004 except June, July, and December.

Graph 4: Turn-of-the-month effect in the Montenegrin capital market in 2008.



The effect of the world financial crisis is present in 2008. Growth rates are negative for almost all months. Turn-of-the-month effect is recognized in this year because the growth rates are significantly higher at the end of the month compared to those for the whole month.

Next step is to test whether the turn-of-the month effect in the Montenegrin capital market is statistically significant. The test is based on the following regression model

$$R_t = a + \sum_{t=1}^{24} b_t D_t + e \tag{3}$$

where R_t is the continuous compounded return on the stock index, D_t is daily dummy variables defined as follows: D_1 is 1 for the first day of the month and 0 for other days of the month, D_2 is 1 for the second day of the month and 0 for other days, etc., and e is the error term. The intercept constant a represents the average return for the end of every month of the year, since those days are represented by the situation when each of the 24 dummy variables is equal to 0. The expected return for the first day of the month is equal to $(a+b_1)$. If the dummy variable coefficients are all negative it indicates that the return at the end of the month is the largest, and it is consistent with the turn-of-the-month effect. If the coefficient of a dummy variable is positive it indicates that the given days' return is greater than the return for the days at the end of one month.

The results of the estimation are as follows:

Dependent Variable: RTNEX20				
Method: Least Squares				
Sample (adjusted): 3/04/2003 12/31/2010				
Included observations: 2044 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001207	0.000382	3.159776	0.0016
D1	7.52E-05	0.001035	0.072705	0.9420
D2	-0.000948	0.001028	-0.922295	0.3565
D3	-0.002769	0.001048	-2.641460	0.0083
D4	-0.000583	0.001048	-0.555926	0.5783
D5	-9.02E-05	0.001041	-0.086584	0.9310
D6	-0.000497	0.001048	-0.474070	0.6355
D7	-0.000598	0.001041	-0.574032	0.5660

D8	-0.000139	0.001035	-0.134648	0.8929
D9	-0.001983	0.001028	-1.928519	0.0539
D10	-0.002603	0.001041	-2.500027	0.0125
D11	-0.000145	0.001048	-0.138580	0.8898
D12	-0.000342	0.001041	-0.328860	0.7423
D13	-3.90E-05	0.001048	-0.037251	0.9703
D14	-0.001517	0.001041	-1.456384	0.1454
D15	-0.002015	0.001035	-1.947741	0.0516
D16	-0.001408	0.001028	-1.369674	0.1709
D17	-0.001715	0.001041	-1.647193	0.0997
D18	0.000181	0.001048	0.172711	0.8629
D19	-0.000366	0.001041	-0.351713	0.7251
D20	-0.001257	0.001048	-1.199672	0.2304
D21	0.000816	0.001041	0.783689	0.4333
D22	-0.000182	0.001035	-0.175481	0.8607
D23	0.000226	0.001028	0.220189	0.8257
D24	-0.001496	0.001041	-1.436477	0.1510
F-statistic	1.069996	Prob(F-statistic)	0.370811	

The estimated intercept has greater value than the dummy variable coefficients. It is also statistically significant at the 1% level. It means that turn-of-the-month effect is present in the capital market of Montenegro. In this test the data for the whole analyzed period have been used. Nevertheless, from the test results it is clear that not all the coefficients of the dummy variables are statistically significant. It is also important to know that this regression is not statistically significant.

3. CONCLUSIONS

The goal of this paper was to examine the presence of calendar anomalies in the Montenegrin stock market. We investigated whether the Montenegrin capital market suffers from the January effect, the holiday effect, and the turn-of-the-month effect.

Empirical evidence indicates that the January effect was present in the Montenegrin capital market before the financial crisis, but not in the crisis period. However, the absence of January effect in the crisis period may be the

result of the small sample used for the analysis, due to lack of available data. It has been shown that the holiday effect has no great impact on this capital market. At the same time the research proves the presence of the last tested anomaly, the turn-of-the-month effect.

Most of the research supports the argument that anomalies will diminish and eventually disappear after their discovery, as more and more investors exploit the anomalies effect.

Even though it could be expected that a small capital market, such as the Montenegrin market, would be inefficient, the results of our investigation show the opposite. The disappearance of at least one of three tested calendar anomalies from the Montenegrin capital market suggests that this market is becoming more efficient. This is mainly due to more knowledgeable and experienced investors, advances in information technology and communications, lower cost of information, etc.

Hence, in the present discussion on capital market calendar anomalies our results stand as evidence in favour of those who advocate market efficiency.

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