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THE TURN-OF-THE-MONTH EFFECT: EVIDENCE FROM MACEDONIAN STOCK EXCHANGE

Fitim Deari*
South East European University, Republic of North Macedonia
E-mail: f.deari@seeu.edu.mk

Yasemin Ulu
Saginaw Valley State University, USA
E-mail: yasemin.ulu@gmail.com

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Abstract: We examine turn of the month effect for the Macedonian Stock Exchange using daily return data utilizing OLS and pooled regression analysis for the 10 components of the MBI10 index. We find that for most of the individual stock returns the coefficients of the turn-of-the-month effect are all positive indicating the presence of the turn-of-the-month effect. When the data is pooled, we obtain even stronger results. The study confirms that the turn-of-the-month effect holds for Macedonian Stock Exchange which has not been examined before. Therefore, on average, the daily return over the turn-of-the-month effect period is significantly higher than the daily return over the rest-of-the-month period and hence providing room for more investment opportunities.

Keywords: anomalous returns; turn-of-the-month effect; OLS; pooled regression.

JEL CLASSIFICATON: G11, G14.

1. Introduction

Despite assumptions proclaimed by the Efficient Market Hypothesis (commonly referred to as EMH), inefficiencies in financial markets are documented by a plenty number of empirical studies. The contribution of Fama (1970) is developed by further studies and thus are evidenced several types of anomalous returns such as turn-of-the-month effect, day-of-the-week effect (Friday or Monday effect), holiday returns, political election cycle effect, dividend effect, month-of-the-year effect (December or January effect), the turn-of-the-year effect, etc.

* Corresponding author: Fitim Deari. *E-mail: f.deari@seeu.edu.mk*

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Such anomalies in financial markets make it difficult to find the best risk-return relationship as it is predicted commonly by standard asset pricing models. For example, Gultekin and Gultekin (1987) show that Arbitrage Pricing Theory (APT) model can explain the risk-return relation mostly for January. Of course, information related to stocks could help investors whether to enter or exit the market, by making different forecasting and simulation analyses (see e.g., Dumiter and Turcaș, 2022; Shobande and Shodipe, 2021). Thus, improving the portfolio performance by considering returns anomalies remains a crucial task for portfolio managers.

Therefore, returns anomalies evidence in addition to the Efficient Market Hypothesis arguments can support decision makers on financial markets. In this context, returns anomalies including the turn-of-the-month (TOM, hereafter) effect have attracted the interest of several scholars during past decades.

Scholars, using similar conventional approaches including the random walk, the regression analysis, AR and GARCH, parametric and nonparametric tests, and using different samples over different periods confirm the presence of TOM in several cases, among other anomalies.

However, to our knowledge, there is no study for the TOM effect in the case of the MBI10 index. Thus, based on the arguments above, the study aims to investigate the presence of TOM effect in the case of 10 shares components of the MBI10 index and provides the following hypothesis:

Hypothesis 1: The daily return over the TOM period is higher than the daily return over the rest-of-the-month period in the case of the MBI10 index.

The rest of the paper is organized as follows: Section 2 provides an overview of previous theoretical studies, Section 3 provides data and methodology, Section 4 presents the results, and the final section provides the conclusions and limitations of the study.

2. Literature review

There are intensive studies that investigate the existence of returns' anomalies (see e.g., Agrawal & Tandon, 1994; Claessens, Dasgupta and Glen, 1995; Keloharju, Linnainmaa and Nyberg, 2016) and such calendar anomalies tend to occur at turning points in time (Jacobs and Levy, 1988). Further, the turn-of-the-year effect is examined by Griffiths and Winters (2005), Ziemba (1988), whilst Watanapalachaikul and Islam (2006) examine the day-of-the-week effect and the January effect using returns from the Thai stock market (SET) index.

In addition, anomalous returns are being examined from different research perspectives over the past decades. For example, recently Shanaev, Shuraeva and Fedorova (2022) investigate the US stock market over the period 1928–2021 and

find positive abnormal returns around the "prediction" of early spring, while buy-and-hold returns around the "prediction" of a long winter are 2.78% lower.

Andrikopoulos, Wang and Zheng (2019) prove that the weather has no effect on the stock and currency markets of London and New York. Further, Verdickt (2020) investigates fertility behavior and proves that a decrease in fertility growth negatively forecasts real excess returns, several months ahead.

Further, examining the relationship between stock prices and related factors could be beneficial to investors and portfolio managers. For example, Vrînceanu, Horobeț, Popescu and Belaşcu (2020) examine the relationship between oil price fluctuations and renewable energy stock returns.

Thus, the behavior of investors can be influenced by several factors during an investment process and consequently affect stock prices. For example, while some feel more optimistic, other investors could feel more pessimist to make equity investments. There could even be behavioral biases as evidenced by Isidore and Christie (2019). The authors measure several behavioral biases exhibited by investors such as representativeness, overconfidence, anchoring, gambler's fallacy, availability bias, loss aversion, regret aversion, mental accounting, and optimism bias. Recently, Zhao and Lin (2022) find that the beta anomaly in the Chinese stock market is mainly driven by behavioral effects measured by lottery demand or idiosyncratic risk.

A recent article by Božović (2022) shows that abnormal returns are driven by stocks having weaker correlations with the market.

In addition, Zhao, Liano and Hardin (2004) examine the presidential election cycle hypothesis by observing returns from the daily S&P 500 index, the DJIA index, and the NASDAQ Composite index. The authors show that higher turn-of-the-month returns are in the second half of presidential terms and thus can increase household liquidity prior to elections.

Yang et al. (2018) investigate the month-of-the-year impact of 28 major industry stocks in Taiwan between 2008 to 2016. Choi, Ryu and Seok (2017) reveal that whilst the highest net flows are evident in January, the lowest is in December. Furthermore, the authors note that past performance affects the seasonality in the cash flows of equity funds.

Berges, McConnell and Schlarbaum (1984) find the January effect for Canadian stocks over the period 1951-1980. Ogden (1990) documents the monthly effect using stock index returns over the period 1969-1986. However, Steven, Winson and Rudolf (1991) investigate the returns of stocks in the Cowles Industrial Index and show that excess returns at the turn of the year and for the month of January were not significant until after 1917.

Further, McConnell and Xu (2008) find that investors received no reward for bearing market risk except at the turns of the month over the period 1926-2005. Similarly,

Cadsby (1992) finds that investors for risk-taking will be rewarded at the turn of the month but not during the rest of the year and late in the week but not early in the week.

Kunkel, Compton and Beyer (2003) show that a 4-day TOM period accounts for 87% of the monthly return, on average, in the stock markets of 15 countries. Lakonishok and Smidt (1988) show evidence of persistently anomalous returns by examining 90 years of daily data on the DJIA index. The authors (commonly referred to as the L&S model) find the TOM effect, by showing that the average rates of return over the interval -1 to 3 are significantly higher than over other days. Jordan and Jordan (1991) using the Dow Jones Composite Bond Average over the period 1963-1986 find January, turn-of-the-year, and week-of-the-month effects, but no significant day-of-the-week or turn-of-the-month effects. However, using the S&P 500 stock index the authors find the TOM effect.

Redman, Manakyan and Liano (1997) investigate four calendar anomalies for real estate investment trusts and common stocks over the period 1986-1993 and find that returns tend to be higher in January, on Friday, on turn-of-the-month trading days, and pre-holiday trading days. Similarly, Ma and Goebel (1991) in the GNMA find the existence of the day-of-the-week, the turn-of-the-month, the holiday, and the turn-of-year effect. Chamberlain, Cheung and Kwan (1991) using the daily return of the S&P index over a period of more than half a century reveal that stock returns tend to be higher at the turn of the month.

Thus, motivated by prior empirical studies, this paper aims to examine the TOM effect in the case of the Macedonian Stock Exchange (MSE, hereafter). The paper contributes to the existing literature by providing empirical evidence in the case of the MSE.

The paper differs from previous studies that examine the MSE market since to our knowledge no study investigates the TOM effect (see e.g., Angelovska, 2013; Svrtinov et. al. 2017; Avdalović and Milenković, 2017; Trajkovska, 2018).

Further, we investigate the existence of the TOM effect for the 10 shares components of the MBI10 index (ALK, STB, GRNT, KMB, MPT, TTK, TEL, MTUR, TNB, SBT) individually and also using a pooled regression analysis.

3. Data and methodology

The price data used in this study is downloaded from the MSE web page (https://www.mse.mk/) and cover the period from January 1, 2006, to October 26, 2021. In this study, we use daily returns constructed from the price data on the stocks of the MBI10 index.

Previous studies deploy commonly OLS dummy variable regression (see e.g., Kunkel, Compton and Beyer, 2003) but other methods are also considered. For

example, Brock, Lakonishok and LeBaron (1992) use moving averages and trading range breaks.

In this study, we employ OLS regression analysis with a dummy variable to investigate the existence of the TOM effect for the 10 shares components of the MBI10 index (ALK, STB, GRNT, KMB, MPT, TTK, TEL, MTUR, TNB, SBT) individually and by utilizing a pooled regression analysis. We utilize the pooled regression analysis technique to overcome the data limitations on the whole MSE index returns and to gain further insight into the overall performance of the largest 10 shares.

The dependent variable ($r_{i,t}$) is calculated as follows:

$$r_{i,t} = 100 * ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right) \quad (1)$$

where $r_{i,t}$ is the return of stock *i* at day *t,*
$P_{i,t}$ is the last traded price of stock *i* at day *t,* and
$P_{i,t-1}$ is the last traded price of stock *i* at day *t-1*.

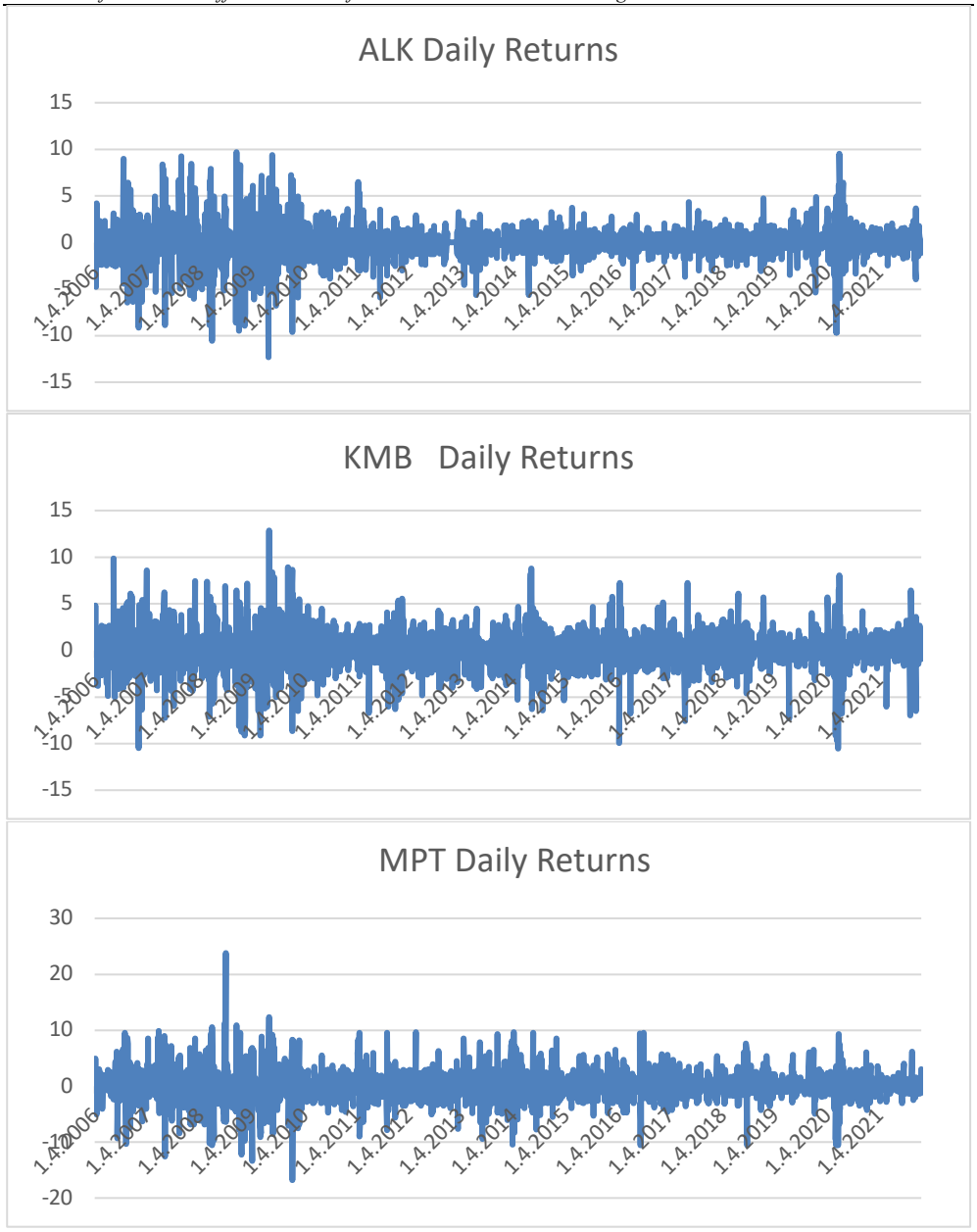
The general form of the model which is going to be estimated in this study is as follows:

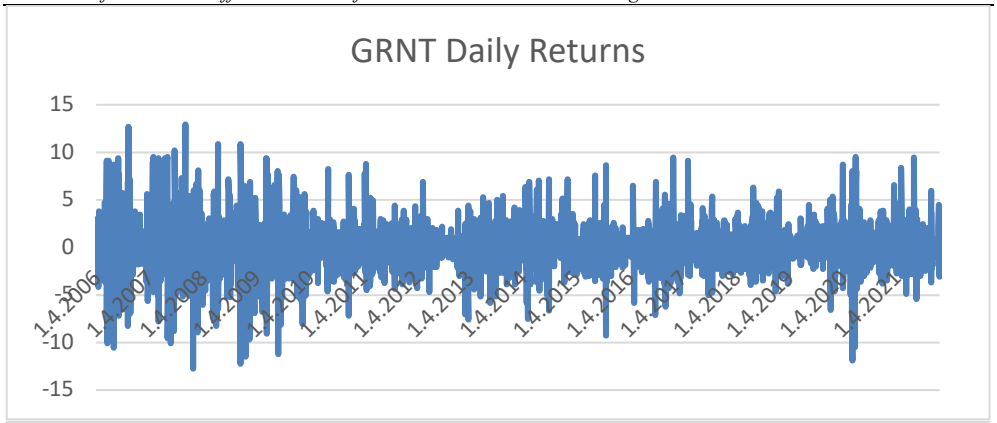
$$r_t = \beta_0 + \beta_1 Dummy_t + \varepsilon_t \quad (2)$$

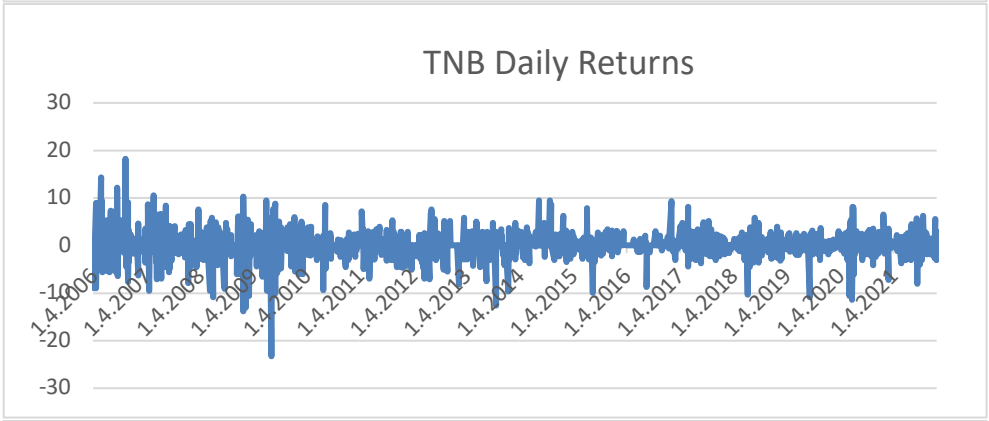
where, $Dummy_t$ is a dummy variable for the 4-day TOM period, i.e., trading days – 1 through + 3 (for more see: Kunkel, Compton and Beyer, 2003).

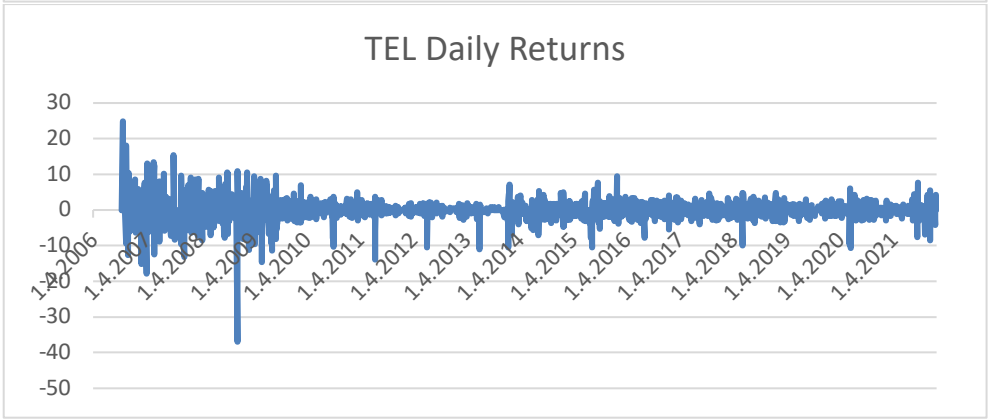
4. Results and discussions

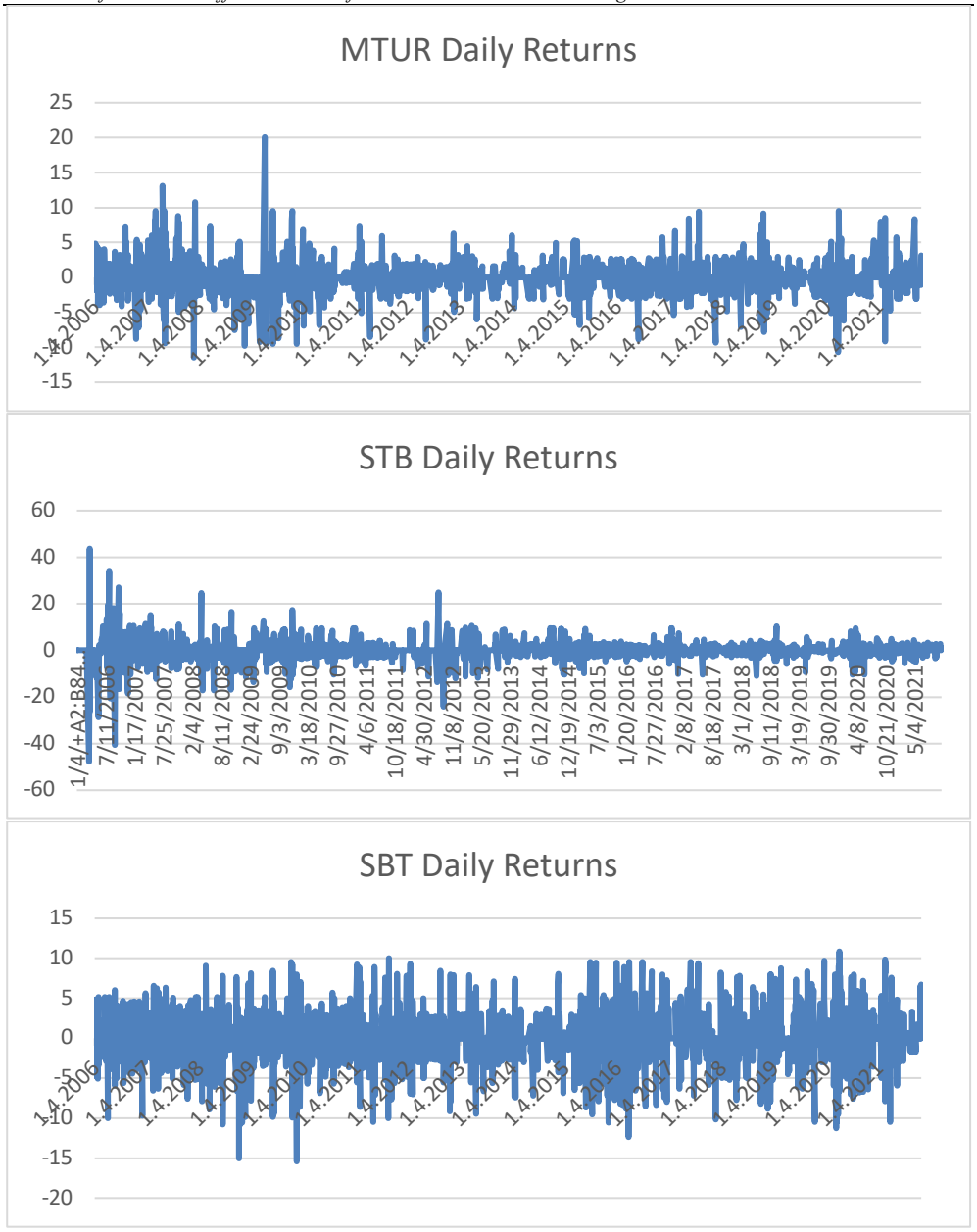
Figure 1 displays daily returns for the 10 shares components of the MBI10 index (ALK, STB, GRNT, KMB, MPT, TTK, TEL, MTUR, TNB, SBT). The weights that constitute the index are determined based on market capitalization. Among these ALK, KMB, MPT have relatively higher weights (about 20%), TTK have the smallest weight about (3%), TNB, GRNT (9.35 and 11.28) respectively STB, TEL, MTUR about 4%.


ALK Daily Returns
15
10
5
0
-5
-10
-15
1.4.2006
1.4.2007
1.4.2008
1.4.2009
1.4.2010
1.4.2011
1.4.2012
1.4.2013
1.4.2014
1.4.2015
1.4.2016
1.4.2017
1.4.2018
1.4.2019
1.4.2020
1.4.2021
KMB Daily Returns
15
10
5
0
-5
-10
-15
1.4.2006
1.4.2007
1.4.2008
1.4.2009
1.4.2010
1.4.2011
1.4.2012
1.4.2013
1.4.2014
1.4.2015
1.4.2016
1.4.2017
1.4.2018
1.4.2019
1.4.2020
1.4.2021
MPT Daily Returns
30
20
10
0
-10
-20
1.4.2006
1.4.2007
1.4.2008
1.4.2009
1.4.2010
1.4.2011
1.4.2012
1.4.2013
1.4.2014
1.4.2015
1.4.2016
1.4.2017
1.4.2018
1.4.2019
1.4.2020
1.4.2021


GRNT Daily Returns
15
10
5
0
-5
-10
-15
1.4.2006
1.4.2007
1.4.2008
1.4.2009
1.4.2010
1.4.2011
1.4.2012
1.4.2013
1.4.2014
1.4.2015
1.4.2016
1.4.2017
1.4.2018
1.4.2019
1.4.2020
1.4.2021


TNB Daily Returns
30
20
10
0
-10
-20
-30
1.4.2006
1.4.2007
1.4.2008
1.4.2009
1.4.2010
1.4.2011
1.4.2012
1.4.2013
1.4.2014
1.4.2015
1.4.2016
1.4.2017
1.4.2018
1.4.2019
1.4.2020
1.4.2021


TEL Daily Returns
30
20
10
0
-10
-20
-30
-40
-50
1.4.2006
1.4.2007
1.4.2008
1.4.2009
1.4.2010
1.4.2011
1.4.2012
1.4.2013
1.4.2014
1.4.2015
1.4.2016
1.4.2017
1.4.2018
1.4.2019
1.4.2020
1.4.2021


MTUR Daily Returns
STB Daily Returns
SBT Daily Returns

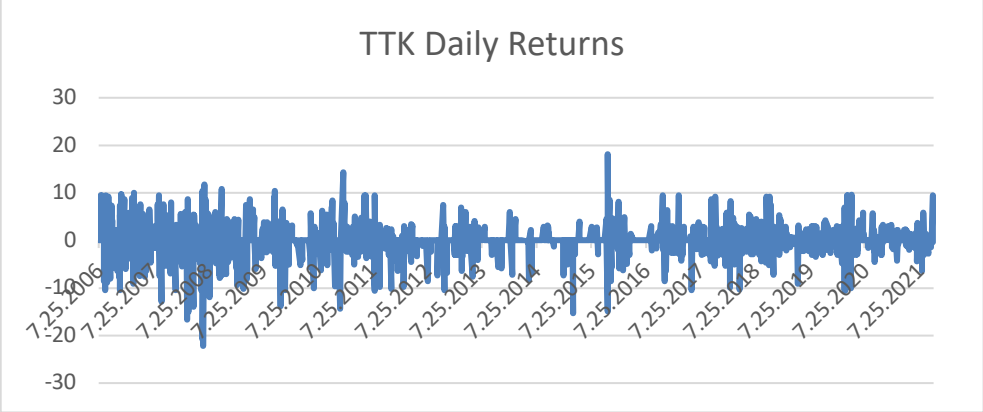


Figure 1 Daily return series computed using Eq (1) for all the indices
Source: own work.
Note: Price data source: https://www.mse.mk/.

Table 1 presents the descriptive statics for all the returns on all 10 stocks. Mean returns are mostly positive aside for SBT (-0.02) and TEL (-0.04) and range between 0.001 (TTK) to 0.041 (GRNT). They are mostly negatively skewed aside from GRNT, MTUR and MPT. They are all uniformly leptokurtic, with kurtosis coefficients ranging from 7.8 to 52. The Jacque-Bera statistics suggest that the normality assumption does not hold for any of the series considered.

Table 1 Descriptive statics

Share Name	Weight based on Market Capitalization	Mean	Median	Maximum	Minimum	St. Deviation	Skewness	Kurtosis	Jaque-Bera Statistics (probability)
ALK	20%	0.04	0.000000	9.684983	-12.3132	1.61762	-0.30542	11.88998	12870.21
KMB	20%	0.027	0.000000	12.85035	-10.53064	1.785937	-0.091520	8.950203	3894.008
MPT	19.40%	0.038	0.000000	23.78909	-16.78809	2.341667	0.278420	11.05363	5743.977
GRNT	11.28%	0.041	0.000000	12.92723	-12.73697	2.298925	0.142060	7.893261	10563.13
TNB	9.35%	0.054	0.000000	18.23216	-23.26716	1.927341	-0.476490	20.60155	60494.43

TEL	5%	-0.0004	0.000000	24.84614	-36.92621	2.155944	-1.145204	41.69842	5963.110
MTUR	4.36%	0.022	0.000000	20.06707	-11.44605	1.594752	0.530601	22.29000	394923.6
STB	4.12%	0.019	0.000000	43.67177	-47.74166	3.080402	-0.551161	52.34908	235127.7
SBT	3.66%	-0.021	0.000000	10.86065	-15.41507	2.355336	-0.278642	9.039854	50362.97
TTK	2.81%	0.001	0.000000	18.12172	-22.17590	2.355599	-0.678098	16.64674	29378.51

Source: own work.

In addition, the standard deviation ranges from 1.59 to 3.08. This implies that whilst some stocks have lower volatility, others exhibit a higher level of risk.

Table 2 presents results from regression (2) for all the 10 stock returns individually and from the pooled regression. We find that all the intercept coefficients are negative and insignificant at the conventional significance levels. We find that for most of the individual stock returns the coefficients on the turn-of-the-month effect are all positive. Among these ALK and STB coefficients are significant at 10%, GRNT and TNB coefficients are significant at 5% and the coefficient on KNB is significant at 1% level. Both MTUR and TEL have negative coefficient estimates, however, they are not significant.

When we analyze the results based on the weights that are assigned relative to market capitalization, we see that for the stocks that have 9% or higher weights the turn-of-the-month effect coefficients are all significant at the conventional levels aside for MPT which is positive but insignificant. For the stocks that have weights of 5% or below, we see that the turn-of-the-month coefficients are all insignificant aside from STB which has a positive significant coefficient at 10%. Among this group of stock returns, we also see negative insignificant coefficients.

When we look at the pooled regression, the coefficient estimate for the turn-of-the-month effect is positive with a value of 0.0075 and significant at a 1% significance level. Pooling the data definitely seems to improve the results.

Our results suggest that the turn-of-the-month effect holds for most of the individual stock returns, especially the ones that have a weight of 9% or higher on the Macedonian Stock Exchange and the results get better when the data is pooled.

Table 2 presents results from the regression (2): $r_t = \beta_0 + \beta_1 Dummy_t + \varepsilon_t$.

Table 2 Regression results

Share Name	Weight based on Market Capitalization	β_0	β_1
ALK	20%	0.016 (0.03)	0.127* (0.06)
KMB	20%	-0.005 (0.03)	0.166*** (0.07)
MPT	19.40%	0.031 (0.05)	0.039 (0.09)
GRNT	11.28%	0.006 (0.04)	0.178** (0.07)
TNB	9.35%	0.024 (0.03)	0.152** (0.07)
TEL	5%	0.021 (0.04)	-0.123 (0.08)
MTUR	4.36%	0.025 (0.03)	-0.016 (0.06)
STB	4.12%	-0.026 (0.05)	0.229* (0.126)
SBT	3.66%	-0.032 (0.04)	0.055 (0.08)
TTK	2.81%	-0.004 (0.05)	0.025 (0.10)
Pooled		0.005 (0.01)	0.075*** (0.03)

Source: own work.
*, **, *** represent 10%, 5% and 1% level of significance respectively. HAC standard errors are in parenthesis.

As Table 2 shows, when the data is pooled, the β_1 coefficient is significant implying that the daily return over the TOM period is significantly higher than the daily return over the rest-of-the-month period which indicates that during the TOM period, stocks experience price increase which consequently lead to higher returns.

Further, the overall intercept coefficient (β_0) shows that the mean return for the rest-of-the-month period is positive but not significant and lower than the mean denoted by the β_1 coefficient (0.005% versus 0.075%). Thus, investors could develop the strategy by setting the entry and exit points in the MSE, i.e., when to buy, hold, and sell stocks.

Therefore, investors and especially portfolio managers have to consider the existence of positive anomalous returns in order to improve the portfolio performance.

Finally, our study confirms the presence of TOM effect in the case of MSE and the result is in line with the previous studies (see e.g., Kunkel, Compton and Beyer, 2003; Lakonishok and Smidt, 1988).

5. Conclusions

In this paper, we examine the TOM effect for the Macedonian Stock Exchange using daily return data ending in October 2021 using OLS analysis for the 10 shares components of the MBI10 index individually and jointly through a pooled regression analysis.

We find that for most of the individual stock returns the coefficients on the turn-of-the-month effect are all positive. Our results suggest that the turn-of-the-month effect holds for the half number of the individual stock returns, especially the ones that have a weight of 9% or higher on the Macedonian Stock Exchange and the results get better when the data is pooled. The study confirms the presence of the TOM effect in the case of MSE and that, on average, the daily return over the TOM period is significantly higher than the daily return over the rest-of-the-month period.

The obtained result, even with its limitations, could help decision-makers in the investment process. It can be helpful mainly to investors and portfolio managers in the line of preparing better strategies to examine the entry and existing points in the national financial market.

Our study has its own limitations given the analysis is conducted on only ten shares. Consequently, it is recommended for future studies to include the rest shares and to consider other variables (e.g., COVID-19 effect, macroeconomic movements, firm characteristics, etc.)

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Author Contributions
Fitim Deari conceived the introduction, literature review, data collection, and discussion of results.
Yasemin Ulu conceived the data analysis and interpretation, some parts of the results and conclusion related to data analysis and edited the text.

Disclosure Statement
The authors have not any competing financial, professional, or personal interests from other parties.

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