



## Investigating The Weekend Anomaly and Its Implications: Evidence From International Financial Markets

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### **Abstract**

**Purpose:** As contended in prior literature, the weekend anomaly is the tendency for financial markets or security prices to be lower on Mondays than on previous Fridays. The aim of this study was to empirically investigate the weekend anomaly in seven international financial markets namely; NASDAQ Index, CAC 40 Index, DAX Index, JPX-Nikkei Index 400, SSE Index, BIST and JSE Index.

**Methodology:** This study made use of the F- statistics test for the most recent 5 years August 22, 2017 to August 22, 2022.

**Findings:** Contrary to the findings in the literature, there is no evidence to support the weekend anomaly. This was evident in the p-values for the F-statistics test in all the financial markets under consideration to be statistically insignificant.

**Originality/Value:** Although this concept may have existed, it is no longer applicable hence traders and market participants should avoid regular or pure arbitrage strategy as it may result in significant losses. As per the author's knowledge, this study is the first to empirically investigate the weekend anomaly in seven international markets using the most recent data..

## **1. Introduction**

As opposed to traditional finance, psychological investing affects the way financial markets function. The psychology of investing explains how investors actually make decisions contrary to how these decisions should be made (Keller & Pastusiak, 2016). This branch of investing can be split into three categories which are; bounded rationality, lack of self-interest and imperfect information. Bounded rationality refers to the notion that the mental capacity of an average investor is limited which leads to spurious decision making (Soukup, Maitah & Svoboda, 2015). Investors are unable to consider all relevant factors for investing because of this type of psychological barrier (Gutsche & Zwergel, 2020). Instead, market participants use heuristics to focus on the important factors that they think are important for decision making (Gigerenzer & Gaissmaier, 2011). Although at times it proves to be beneficial, there are situations where heuristics behaviour may lead to irrational decisions. The lack of self-interest on the other hand is when people actually care about others at the expense of their self-interest which may become destructive. The concept of imperfect information proposes that investors are exposed to an infinite amount of information at any given time but are unable to process most of them (Roetzel, 2019). This leads to the consideration of incomplete and imperfect information which may alter investment decisions. In line with the topic of this study, confirmation bias affects almost all investors. In the context of financial management and investing, confirmation bias is the propensity for investors to search or recall information only to confirm or support their prior beliefs (Peters, 2022). Usually, investors tend to pay more attention to information that supports their views and ignore challenging information. It is universally known that it is not an easy task to outperform the market or consistently trade on market anomalies (Latif, Arshad, Fatima & Farooq, 2011; Kuria & Riro, 2013). However, thousands of investors and market participants are constantly trying to explore these anomalies in an attempt to beat the market (Woo, Mai, McAleer & Wong, 2020). Although there might be some evidence of some of these trends (Enow, 2022) other anomalies maybe due to mere coincidence.

This is particularly true with the psychology of investing relating to the concept of weekend anomaly. The weekend market anomaly refers to the proposition that trends in the stock markets on Monday are generally lower than previous market day returns which may gradually rise during the course of the week (Toit, Hall & Pradhan, 2018). Some market participants and investors rely on this theory in an attempt to predict the direction of the market. This type of anomaly emanates from the fact that security prices or stock market indexes tend to move more on Fridays than on Mondays (Latif, Arshad, Fatima & Farooq, 2011). On a fundamental level, there is no particular explanation for this phenomenon. Perhaps weekend optimising permeates the market as market participants may be looking forward to the weekend. Alternatively, it is also possible that weekend gives investors the opportunity to re-access their risk tolerance and develop a sense of pessimism on Monday. Although several research papers (French, 1980; Abraham & Ikenberry, 1994; Hsiao & Solt, 2004; Yalcin & Yucel, 2006; Singhal & Bahure, 2009; Papakostoulis, 2008; Thushara & Perera, 2012; Cifuentes & Córdoba, 2013; Djalil, Murkhana, Yahya & Aini, 2018; Toit, Hall & Pradhan, 2018) have highlighted evidence of weekend effect, this is still a grey area and highly controversial as market anomalies are at times seasonal.

The research question in this study reads as follows; is there sufficient evidence of the weekend anomaly in international financial markets? Evidence of the weekend anomaly will add to the debate that the efficient market hypothesis does not hold.

The motivation of this study stems from the shift in paradigm from the traditional finance arena where markets tipped to be predominantly efficient or semi strong to the concept of behavioural anomalies. Evidence of weekend anomaly may lead to predictable price changes. This may suggest that trading strategies and algorithm can be developed to predict or explore these price changes. Therefore, exploring the concept of weekend anomaly is incentive based. In markets where the weekend anomaly is present, this study will recommend specific trading strategies which market participant can use to minimise risk and improve the expected return. This

study also contributes to the body of knowledge on the niche area of efficient market hypothesis and market anomalies using the most recent data. This study seeks to advance this frontier by looking at the weekend anomaly in multiple financial markets as well as during a period of distress (Covid-19 pandemic). As per the author's knowledge, this study is the first to empirically investigate the weekend anomaly in seven international markets using the most recent data. These markets are among the top 10 largest indexes in the world.

## **2. Literature**

### **Theoretical overview**

The efficient market hypothesis also known as the EMH proposed by Fama (1970) is a framework for analysing stock prices and how financial markets function. Specifically, the EMH proposes that stock prices reflect all available information (Enow, 2021). Considering that stock prices reflect all available information, only new information will move security prices. Also, financial markets will adjust quickly to reflect this new information making it impossible to beat the market from a performance perspective over the long run. Assuming the EMH holds, fundamental analysis and market anomalies are pointless since the information is quickly reflected in the price of the stock and trends in the market cannot be used to predict the randomness in the future. In essence, all the information that is needed to estimate the fair value of a stock is publicly available.

### **The weekend anomaly**

With the emergence of behavioural finance, the EMH have received increasing criticism. Ever since the 1920's, the weekend market anomaly has been observed in security markets and stock exchanges (Pettengill, 2003). The weekend anomaly is a pattern where the returns on Mondays are relatively lower than the returns on Fridays or a negative return on Friday continues through Monday (Pettengill, 2003). There have been numerous propositions put forth in an attempt to explain this phenomenon. One of such proposition is the idea that companies tend to release bad

news or negative earnings on Fridays which continues to Monday (Doyle & Magilke, 2009). Companies release bad news on Fridays because they believe market participants will forget about it during the weekend which may potentially minimise the impact on the share price as well as the reputation of the company (Hsaio & Solt, 2004). Contrary to this, other researchers have attributed the weekend anomaly to psychology. Market participants may feel confident on Fridays than Mondays which may drive trading volume and market prices higher, hence expected returns (Abraham, & Ikenberry, 1994). Below are studies that have been published citing evidence of the weekend effect.

**Table 1:** Prior literature on Weekend effect

Study	Model	Period	Country	Findings
French (1980)	Bayesian model	1953- 1977	US	Mondays had a significant negative returns than Fridays, hence the evidence of weekend effect.
Abraham & Ikenberry (1994)	Unconditional mean returns	1963-1991	United states (US)	Strong evidence of the weekend effect in the New York stock exchange (NYSE)
Hsaio & Solt (2004)	Henriksson and Merton (1981) non-parametric test	1988- 2000	US	Positive returns on Fridays where followed by negative returns on Mondays significant at 5%. Hence evidence of weekend effect.
Yalcin & Yucel (2006)	E-GARCH model	1994 - 2005	Emerging markets	Evidence of weekend effect in all the markets.
Singhal & Bahure (2009)	ANOVA tests	2003 - 2008	India	As with the other findings, there is evidence of weekend effect.

Papakostoulis (2008)	Fixed effect model	2000 - 2018	European stock markets	Fridays returns were significantly higher than Monday's returns. The author's findings support the weekend effect theory.
Thushara & Perera (2012)	GARCH (1,1) model	2002 - 2011	Denmark	Evidence in support of weekend effect in the Colombos stock market.
Cifuentes & Córdoba (2013)	GARCH (1,1) IGARCH models	Last trading-day of July 2012	Six countries	Weekend effect was present in all six countries.
Djalil, Murkhana, Yahya & Aini (2018)	One sample t-test	2017 - 2018	Indonesia	Evidence of weekend effect in the Indonesia market in the period under review.
Du Toit, Hall & Pradhan (2018)	GARCH model	1995 - 2016	South Africa	Lowest and Highest returns were observed on Mondays and Fridays respectively with significant difference between them. The authors found evidence of the weekday anomaly.
Izadi & Noman (2020)	Parameter stability tests and structural break tests	July 1, 1926 - December 31, 2017	United States	Structural breaks on the weekend anomaly. On a broader scale, the authors supported the absence of the anomaly.
Sahoo (2021)	GARCH model	1 April 2005 - 14 May 2020	India	No statistical evidence of the weekend anomaly in the Indian stock market.
Li & Liu (2021)	Regression analysis	4 January 2000 - 29 December 2017	China	Evidence of weekend market anomaly associated with short selling and volatile markets

**Source:** Author

The above studies are extracts from prior studies on the concept of weekend effect in different stock markets. The weekend effect is a recognised phenomenon and has been widely studied. The findings of all the studies in table 2 indicates the presence of weekend effect which also suggest that the efficient market hypothesis may not be useful (Enow, 2022). The section below highlights the methodology used to further explore this concept with a different approach and a more recent data.

### 3. Data methodology

This study made used the NASDAQ Index, the French stock market index (CAC 40 Index), Frankfurt stock exchange index (DAX Index), Japanese stock index (JPX-Nikkei Index 400), Shanghai stock exchange (SSE Index), Borsa Istanbul (BIST) and Johannesburg stock exchange (JSE Index) as samples. These financial markets are among the top 10 largest markets in the world. The required data which was mainly daily index prices were sourced from yahoo finance which provides real time market information. The sample period was from August 22, 2017 to August 22, 2022. These daily prices were first used to calculate the daily returns given by the formal below;

$$\text{Daily return} = \frac{P_t}{P_{t-1}}$$

An equality of variance test (F- stats Test) was then used to empirically investigate the distribution of these returns in the financial markets under consideration. The F- stats test was suitable for exploring differences in variance for two data sets returns and significance level (Kao & Green, 2008). This type of hypothesis testing allows the researcher to choose between two alternative outcomes for independence testing which is an intuitive method of investigating the weekend anomaly. As opposed to prior literature where much emphasis was placed on regression, this study used the F- stats test to analyse the width of the variance between two returns, namely Fridays and Mondays to draw conclusions on the actual distribution and was also used in the study of Sahoo (2021). The F- stats test is given as follows;

$$\text{F-stats test} = \frac{\text{Max}(S_1^2, S_2^2)}{\text{Min}(S_1^2, S_2^2)} \sim S^2 = \text{variance}$$

$$\text{Standard deviation} = \sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}$$

$$\text{Degrees of freedom (df)} = \frac{\left(\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}\right)^2}{\frac{S_1^4}{N_1^2 (N_1 - 1)} + \frac{S_2^4}{N_2^2 (N_2 - 1)}}$$

(Kao & Green, 2008)

To this end the following hypothesis were examined;

**H<sub>0</sub>:** For the most recent 5 years, there is no significant difference in the returns between Mondays and Fridays, hence the absence of the weekend effect.

**H<sub>1</sub>:** For the most recent 5 years, there is a significant difference in the returns between Mondays and Fridays, hence the presence of the weekend effect. The section below presents the findings of the data that was analysed.

#### 4. Results and discussion

The table below presents the findings of the data analysis.

**Table 2:** Summary of F-test stats output

DAX								
	Mean return	Variance	N	F-stat	Standard deviation	df	t-stats	p-value
<b>Mondays</b>	0.00073	0.00015	242	0.84	0.00091	438.13	0.69	0.49
<b>Fridays</b>	-0.00024	0.00019	249	1.08	0.00099	408.73	-0.33	0.74
<b>Other days</b>	0.00009	0.000176	762					
JSE								
	Mean return	Variance	N	F-stat	Standard deviation	df	t-stats	p-value
<b>Mondays</b>	0.001179971	0.000253	242	0.986	0.00117	407.73	0.87	0.39
<b>Fridays</b>	-0.00119303	0.00039	249	1.51	0.00137	360.74	-0.98	0.33
<b>Other days</b>	0.000158583	0.000257	762					
CAC 40								
	Mean return	Variance	N	F-stat	Standard deviation	df	t-stats	p-value
<b>Mondays</b>	0.000884434	0.000176	242	1.11	0.00096	388.70	0.58	0.56
<b>Fridays</b>	-0.00078174	0.000155	249	0.98	0.00091	426.31	-1.21	0.23
<b>Other days</b>	0.000322448	0.000159	762					
SSE								
	Mean return	Variance	N	F-stat	Standard deviation	df	t-stats	p-value

<b>Mondays</b>	-0.00126249	0.000154	242	1.20	0.000897	377.35	-1.74	0.08
<b>Fridays</b>	0.000401024	0.000117	249	0.91	0.000798	440.34	0.13	0.90
<b>Other days</b>	0.000298581	0.000129	762					
<b>Nasdaq</b>								
	<i>Mean return</i>	<i>Variance</i>	<i>N</i>	<i>F-stat</i>	<i>Standard deviation</i>	<i>df</i>	<i>t-stats</i>	<i>p-value</i>
<b>Mondays</b>	0.001055054	0.000198	242	0.770	0.001075	456.04	0.33	0.73
<b>Fridays</b>	0.000369869	0.000216	249	0.839	0.001097	456.12	-0.29	0.76
<b>Other days</b>	0.000696886	0.000257	762					
<b>JPX-Nikkei Index 400</b>								
	<i>Mean return</i>	<i>Variance</i>	<i>N</i>	<i>F-stat</i>	<i>Standard deviation</i>	<i>df</i>	<i>t-stats</i>	<i>p-value</i>
<b>Mondays</b>	0.000807484	0.000228	242	0.843	0.001139	437.07	0.22	0.82
<b>Fridays</b>	0.000482713	0.000219	249	0.806	0.001110	464.72	-0.06	0.94
<b>Other days</b>	0.000553049	0.000271	762					
<b>BIST</b>								
	<i>Mean return</i>	<i>Variance</i>	<i>N</i>	<i>F-stat</i>	<i>Standard deviation</i>	<i>df</i>	<i>t-stats</i>	<i>p-value</i>
<b>Mondays</b>	0.001707845	0.000177	242	0.115	0.00165	998.26	1.40	0.16
<b>Fridays</b>	0.001232255	0.000221	249	0.144	0.00170	989.24	1.08	0.27
<b>Other days</b>	-0.00061382	0.001532	762					

Source: Author

Table 2 above presents several interesting findings which will be discussed in this section. Firstly, the notion that Monday returns are generally lower than Friday returns is not consistent with the findings of this study. This is evident in the DAX, JSE, CAC 40, Nasdaq, Nikkei and BIST where the average returns on Mondays are higher than that of Friday returns for the most recent 5 years with the exception of SSE. This finding is in contrast with those of French (1980); Abraham & Ikenberry (1994); Hsaio & Solt (2004); Yalcin & Yucel (2006); Singhal & Bahure (2009); Papakostoulis (2008); Thushara & Perera (2012); Cifuentes & Córdoba (2013); Djalil, Murkhana, Yahya & Aini (2018); Toit, Hall & Pradhan (2018). Also, the p-values for Mondays and Fridays in all the financial markets under consideration are more than 5%, indicating the absence of the weekend effect in the most recent 5 years. Although this anomaly was well documented in the 20's, it may be possible that they are no longer present. This may be due to new financial products and the proliferation of multiple investment strategies. Also, it may be possible that market

participants have traded on this type of anomaly which have gradually disappeared from the market. Therefore, the null hypothesis which states that there is no significant difference in the returns variance between Mondays and Fridays is accepted while the alternate is rejected.

## **5. Conclusion**

The aim of this study was to investigate the weekend anomaly in international financial markets for the most recent 5 years. The concept of the weekend anomaly began in the 20's when the first calendar anomaly was first observed. Supporters of this concept have provided several explanations ranging from negativity surrounding new working week to bad news published on Fridays. This study explored the weekend anomaly concept using the most recent 5 years' data. Using F-test statistics, the findings of this study revealed that there is no evidence of weekend anomaly in the financial markets under consideration. Several authors in prior literature recommended that short term investors or traders should sell their stocks on Fridays and buy them back on Mondays to make quick returns. Contrary to this, there is no statistical evidence to support this type of trading. Although market anomalies like overreaction and underreaction and price clustering do exist till date (Enow, 2022; Enow, 2022), there is no evidence of the weekend anomaly in financial markets. The absence of the weekend anomaly may indicate some sort of market efficiency and hence the existence of the EMH. When developing investment strategies, it may be prudent to assume that markets may be efficient and security prices may be follow a random walk. Propositions on the weekend anomaly should be accompanied by models and algorithm to explain and explore the anomaly.

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