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A Brief History and Recent Developments in Day-of-the-Week Effect Literature

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ABSTRACT: This paper aims to offer a concise overview of the weekend effect and subsequently explore recent advancements in our understanding of this phenomenon. Recent studies' findings are systematically organized and summarized based on their research questions and outcomes. In earlier literature, a consistent weekend effect was identified, characterized by positive returns on Fridays and negative returns on Mondays. However, recent research suggests that this effect is shifting to different days, reversing its pattern, or disappearing altogether. As a result, investors may face challenges in developing effective trading strategies based on current research findings.

I.INTRODUCTION

The subject of financial market informational efficiency has been extensively studied in financial economics, prompting considerable debate among both academics and practitioners. Fama's (1970) groundbreaking research delineates three levels of market informational efficiency: weak, semi-strong, and strong forms. The weak and semi-strong forms, in particular, assert that asset prices in financial markets incorporate all pertinent information from historical price data and other publicly available information, respectively. The fundamental idea of efficient capital markets, where asset prices rapidly adjust to reach a balanced state, is a cornerstone in financial asset pricing models. Numerous researchers have undertaken empirical examinations of varying degrees of market efficiency across different assets and geographic locations. These investigations have yielded diverse outcomes. Given the logical and theoretical attractiveness of informationally efficient markets, and considering that testing market efficiency involves evaluating both efficiency and the assumed returns model, researchers frequently identify certain persistent and systematic market inefficiencies as anomalies. Calendar anomalies represent a well-examined category of pricing irregularities, stemming from the identification of consistent patterns in security returns during specific calendar periods. Financial investigations have revealed several such potential anomalies. The January effect, as documented by Rozeff and Kinney (1976) and others, denotes observable systematic price fluctuations surrounding the beginning of a new calendar year. The weekend effect, highlighted by Cross (1973), French (1980), and others, pertains to consistent differences in returns across weekdays, particularly Mondays. Similarly, the turn-of-the-month effect, discussed by Ariel (1987), Lakonishok and Smidt (1988), and others, refers to predictable return patterns associated with the initial and final days of a calendar month. Calendar anomalies pose challenges to the concept of weak-form market efficiency. The efficient markets hypothesis suggests that asset prices adjust swiftly in response to new information, resulting in an unpredictable and erratic price pattern. Should a predictable pattern emerge, profit-maximizing investors would exploit it, leading to price adjustments that eliminate the pattern. Conversely, the failure of prices to accurately incorporate relevant historical price information may result in systematic mispricing and capital misallocation. Additionally, portfolio management could become more complex if popular empirical models used in this field fail to account for these return regularities, potentially resulting in biased returns estimates, as noted by Jain (1986).

In addition to providing an opportunity for speculative trading based on predictable price movements, the existence of calendar effects presents a legitimate avenue for long-term and regular investors, such as those employing dollar-cost averaging, to enhance their returns. While transaction costs may offset the benefits of this strategy, Compton and Kunkel (1999) suggest that trading within certain tax-advantaged accounts can be executed without incurring costs. Despite transaction costs, investors can optimize their returns by timing their trades to coincide with days when advantageous price movements are expected. Jacobs and Levy (1988) propose this approach, highlighting that such a strategy could potentially increase annual returns by over $14,000 for a portfolio with weekly cash flows of $100,000. The aim of this paper is to examine recent research pertaining to the weekend effect, serving as an introduction to the subsequent papers in this

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edition. The paper is structured as follows: Firstly, we offer background information derived from two seminal empirical studies on the weekend effect, which laid the foundation for the extensive body of literature that ensued. Subsequently, we provide a concise overview of the trajectory of research on the weekend effect up to 2003, drawing upon and modifying insights from Pettengill (2003). Finally, we assess pertinent research published post-2003, elucidating how its implications align with the existing research framework.

II.LITERATURE REVIEW

Early work

Cross (1973) was among the pioneers in identifying recurring patterns in stock returns relative to the day of the week. His analysis encompassed a dataset spanning 844 weeks (1953-1970) of returns data for the Standard and Poor's Composite Index, aiming to uncover consistencies in the magnitude and direction of price fluctuations across different days, as well as the index's performance in relation to the preceding day. Throughout this period, the index experienced upward movement on approximately 62 percent of Fridays, with an average Friday percentage change of +0.12 percent. In contrast, Mondays witnessed advances only 39.5 percent of the time, with an average Monday percentage change of -0.18 percent. Furthermore, Cross observed a correlation between the performance of the index on Mondays and its performance on the preceding Fridays. During the study period, if the index had risen on the previous Friday, it had an equal chance of either increasing or decreasing on Monday. However, if the index had declined on Friday, the likelihood of it increasing on Monday was only 0.24. This contrasted sharply with the behavior observed on other days, where the probability of an advance following a decline was, on average, 0.49, and the probability of an advance following an advance the previous day was, on average, 0.63. Pettengill (2003) offers a comprehensive overview of existing research on the weekend effect. In his analysis, he categorizes the available literature into three main groups: research that confirms the presence of the weekend effect, research that investigates the underlying causes of the phenomenon, and research that evaluates the effectiveness of trading strategies based on the effect.

Until 2003, extensive research corroborates the presence of the weekend effect across various asset markets. Numerous investigations explore this phenomenon within debt markets, encompassing a range of money market instruments such as Treasury bills, federal funds, and repurchase agreements, as well as Treasury bonds, mortgage-backed securities, and corporate bonds. Intriguingly, studies reveal that the magnitude of the weekend effect tends to escalate with the maturity duration of Treasury securities.

One notable emerging pattern highlighted by Pettengill in the literature on the weekend effect is the alteration and reversal of this phenomenon concerning securities of large companies. Various studies, when analyzing returns of large corporations separately from those of smaller entities, observe that the weekend effect undergoes a transformation over sub-periods within extended sample periods spanning from 1963 to 1998. Initially, for large companies, the effect manifests as a significant negative impact on Mondays, which later transitions into a non-significant negative influence, and eventually evolves into an average positive and significant effect. The timing of these shifts varies across studies, aligning with significant changes in market structure such as the deregulation of brokerage commissions in 1975, the introduction of stock index futures in 1982, and the market crash of 1987. Conversely, the consistent negative Monday effect persists for stocks of smaller firms. Research findings highlighted by Pettengill regarding the weekend effect also delve into the contingent aspect of Monday returns. Multiple studies conducted up to 2000 validate Cross (1973) observations indicating that Monday returns are contingent upon Friday returns, particularly evident when Friday returns are negative. The degree of correlation in this context has been demonstrated to fluctuate based on the time of year and month, with such conditionality extending to markets beyond the United States.

Until 2003, researchers have proposed various potential justifications for the weekend effect, but despite their apparent logical appeal, none has garnered widespread agreement. Pettengill categorizes these explanations into several groups, including those rooted in statistical inaccuracies, micro-market phenomena, information dissemination, and order execution. Two primary statistical error arguments, namely data mining and reliance on a normality assumption, attempt to explain the observed weekend effect. However, Pettengill refutes both assertions, pointing to the extensive body of research employing diverse and rigorous statistical methodologies across various sample periods, all of which consistently confirm the presence of the weekend effect.

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Various market structures have been proposed as potential drivers of the weekend effect. For instance, one suggestion involves the settlement process of typical trades combined with the time required for check clearance. According to this view, purchases made on Fridays introduce a weekend into the settlement period, providing an additional two days of float. However, this explanation is contradicted by research indicating that the weekend effect is most pronounced when interest rates are low, rendering float less valuable. Pettengill highlights other proposed rationales, such as the Friday correction of prior measurement errors and the notion that ex-dividend dates may disproportionately coincide with Mondays. However, neither of these hypotheses is supported by empirical evidence. Certain scholars propose that the weekend effect may stem from a consistent weekly pattern in the dissemination of information, which is mirrored in stock prices. As an illustration, companies might opt to disclose unfavorable earnings reports on Friday afternoons to mitigate market disturbances and a prompt negative reaction in stock prices. Nevertheless, empirical investigations indicate that only a minor portion of the weekend effect can be ascribed to earnings announcements. Pettengill also outlines a range of potential factors contributing to the weekend effect, including the impact of human behavior and institutional practices on order flows. One plausible explanation for the negative Monday effect is the general lack of optimism among individuals as they return to the workweek. Additionally, it is proposed that individual investors may require time to process information before making selling decisions, and weekends afford them this necessary time. With the increasing prominence of institutional investors, one might expect this negative Monday effect to diminish. Another suggested explanation involves short selling, as studies suggest that short sellers may avoid the unlimited risk associated with open positions over weekends by purchasing stocks on Fridays to close their positions and selling on Mondays to re-establish them. Ultimately, studies conducted before 2003 generally disprove the feasibility of constructing a trading strategy solely reliant on the weekend effect. Despite the statistical significance of these effects, their actual impact is relatively minor, such that any potential profits are outweighed by transaction costs and taxes. However, there is an exception when it comes to trading within specific tax-advantaged retirement accounts, where trading can sometimes be executed at negligible costs for investors.

Post-2003 work

Over the last seven years, studies on the weekend effect have employed methodologies similar to those used before 2003. Researchers have revisited familiar research inquiries, refining them with recent data and employing more rigorous statistical techniques. Additionally, they have expanded their investigations to encompass additional international markets. The primary areas of focus in recent research involve exploring changes or deviations in the conventional weekend effect and examining theories related to order flow as a potential explanation for this phenomenon.

Recent studies have continued the exploration of the weekend effect. Boudreaux et al. (2010) investigate the returns of the DJIA, S&P 500, and NASDAQ indexes from 1976 to 2002. They divide their dataset into periods of bear markets and non-bear markets and observe that weekend returns surpass non-weekend returns consistently only during non-bear markets. In bear markets, heightened weekend returns are evident solely in the NASDAQ index. They attribute this observation to a wealth effect: during bullish periods, investors, feeling financially secure, are more inclined to act on broker recommendations during weekdays. However, when they reassess their investments over the weekend, they engage their "rational mind," leading to sell orders being executed on Mondays. Meanwhile, Keef and Roush (2005) explore an extension of the Friday effect to trading days preceding holidays. Their analysis spanning from 1930 to 1999 finds no comparable effect in the S&P 500. Marrett and Worthington (2009) investigate the phenomenon by extending it to explore a broader holiday effect in Australia. Their analysis spanning from 1996 to 2006 reveals a positive pre-holiday effect in the Australian market, particularly notable in small-cap stocks. Kamaly and Tooma (2009) delve into the stock markets of 12 Arab nations during the period 2002-2005. They discover a significant daily returns pattern associated with the first and last trading days of the week, noting that different Arab countries observe different trading weeks, with most markets closed on Fridays. This pattern is observed prominently in the four most developed markets: Egypt, Bahrain, Kuwait, and UAE. Basher and Sadorsky (2004) explore stock returns across 21 emerging countries on four continents from 1992 to 2003. While Monday mean returns tend to be negative across these countries, the Monday effect is statistically significant in only four nations: Turkey, Thailand, Taiwan, and Malaysia. These effects persist even after adjusting for market risk. Generally, studies post-2003 do not extensively report a weekend effect in foreign markets.

Numerous studies conducted after 2003 explore the presence of the day-of-the-week effect in assets beyond stocks, generally revealing that if a daily effect is observed, it deviates from the traditional weekend effect. Bouges et al. (2009) investigate weekend effects in American depository receipts from 1998 to 2004, concluding that no discernible daily effect in returns exists. Nippani and Pennathur (2004) identify a significant negative effect in changes of commercial paper yield

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rates specifically on Wednesdays. Aggarwal et al. (2003) scrutinize returns, standard deviations, skewness, and kurtosis of returns across various commodity, stock index, interest rate, and currency futures contracts spanning from 1983 to 1997. Their findings suggest that while certain contracts exhibit some day-of-the-week effects during the period, the results lack consistency across contracts and moments, thereby failing to support the presence of an exploitable effect. This inconsistency in weekday patterns, compared to earlier studies, is also apparent in the yen market. Yu et al. (2008) observe that from 1994 to 2003, daily returns in the yen spot market yield the highest returns on Thursdays and the lowest returns on Tuesdays, with the traditional Friday and Monday effects absent. Similarly, shifts of the weekend effect to other days have been documented in the market for initial public offerings, with Mondays displaying positivity (Jones and Ligon, 2009), and in mortgage real estate investment trusts, where Tuesdays and Thursdays exhibit positivity while Wednesdays show negativity (Lee and Ou, 2010).

Studies investigating the weekend effect in US stock prices have observed and analyzed the transition of Monday returns towards positivity (a reverse weekend effect) and a redistribution of effects across other days. Galai et al. (2008) contend that a large portion of the conventional Monday effect stems from extreme data values. Upon examining S&P 500 index returns while controlling for outliers, they find that the Monday effect becomes positive and statistically significant. Doyle and Chen (2009) scrutinize 11 major stock markets spanning from 1993 to 2007. They identify a "wandering weekday" phenomenon whereby the day demonstrating consistently high or low returns is highly contingent on the selected sub-period. Despite recent indications of the weekend effect, waning, reversing, or relocating, contemporary studies focus on order flow-based explanations for its persistence. Notably, substantial efforts have been made to understand the role of short selling in driving the weekend effect. Blau et al. (2009) explore the notion that short selling contributes to the weekend effect by examining daily short sale activity. Contrary to previous assumptions, their analysis of NYSE shares in 2005 reveals no discernible increase in short selling on Mondays compared to other days. Interestingly, they find heightened short-selling activity on Fridays, a finding that contradicts earlier hypotheses. In the NASDAQ market during 2000-2001, Christophe et al. (2009) uncover a significant traditional weekend effect, especially prevalent in smaller firms. They observe that while speculative customers engage in more short sales on Mondays, institutional short selling is more pronounced on Fridays. Christophe et al. dismiss short selling as the primary driver of the weekend effect.

IV.CONCLUSION AND FUTURE WORK

Initial investigations into day-of-the-week effects in stock markets consistently revealed a markedly positive return on Fridays and a notably negative return on Mondays. This irregularity was identified across various asset markets, both domestic and international. Despite numerous proposed explanations, researchers struggled to offer a definitive rationale for this phenomenon. However, as researchers expanded their datasets and refined statistical techniques over time, the observed effects began to undergo changes, shifting to different days or disappearing altogether. Previously posited explanations gradually lost their explanatory power, even within sample periods demonstrating the conventional weekend effect.

The disappearance of the day-of-the-week effect can be attributed to at least two plausible reasons. Firstly, it is possible that the initial skeptics who deemed the effects as mere artifacts or outcomes of data mining were accurate in their assessments. The proliferation of studies with conflicting results has cast doubt on the validity of the entire effect. Secondly, it is conceivable that investors take note of price patterns in securities, and when these patterns receive sufficient attention, investors may react accordingly, thereby altering or eradicating those patterns. This interpretation presents a potential avenue for revisiting the concept of weak-form informational market efficiency, which has been challenged by calendar anomalies.

Humans naturally gravitate towards order and predictability. In the realm of risky and unpredictable markets, this inclination becomes even more pronounced as individuals strive to identify patterns. Consequently, irrespective of the current direction of findings and interpretations, researchers will remain captivated by apparent trends in the movements of security prices.

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