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## The day-of-the-Week effects of stock markets in different countries

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## ABSTRACT

This paper applies the method of rolling sample test and the GARCH model to investigate the day-of-the-week anomalies in stock returns of main indices in 28 markets from 25 countries over the world. We propose the calendar effect performance ratio to measure the significance of day-of-the-week anomalies in this paper. Our study demonstrates that the Monday anomalies are prominent in SZC<sup>1</sup>, DOW, Merval, WIG20, FTSEMIB and STI index; the Tuesday anomalies are prominent in SPX, SPXT; the Wednesday anomalies are prominent in MEXBOL, JCI, DAX, SMI, AS51, NKY and NZSE50FG; the Thursday anomalies are prominent in SMEC, PX and PCOMP; the Friday anomalies are prominent in IBOV, IPSA, RTSI\$, XU100, SENSEX, FBMKLCI, IBEX, and HSI index. We also investigate calendar effects for 6 stock market indices measured in US dollars and still find the calendar effect phenomena for these selected indices when they are in US dollars. The findings in this paper will be valuable to both the academia and practitioners.

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### 1. Introduction

The Efficient Market Hypothesis (EMH) proposed by Fama in 1965 states that the response of market is offhand for information, none can utilize these public information to acquire higher return than the return that is adjusted via market risk, namely none can beat the market. However, in financial markets, especially in stock markets, there is evidence of calendar effects that will create higher or lower return than its intrinsic value. We can define this as an anomaly because it cannot be explained by existing theories. The calendar effects are one of the famous phenomena of abnormal returns. These facts are tested by a good deal of empirical research and daily observation. Calendar anomalies include: time-of-the-day effects, day-of-the-week effects, week-of-the-month effects and month-of-the-year effects. The day-of-the-week effects refer to the tendency of stocks to exhibit relatively large returns on one particular day (for example, Friday) compared to the rest of the days in the week. Study of calendar anomaly shows that investor can use the existing anomalies for predicting stock price movement in a certain single day. The studies on day-of-the-week effect have been ongoing since 1930 when Kelly revealed the existence of a Monday effect on the US markets where the returns turned out to be negative. The day-of-the-week effect phenomenon results in a different return for each day of a week. This phenomenon of return can affect

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investors in deciding investment strategy, portfolio selection, and profit management. Many abnormal phenomena have been found in financial markets, but these abnormal phenomena cannot be explained very well by the traditional finance theory. Though many studies in the literature have demonstrated that the calendar effects exist in all stock markets worldwide, the conclusion does not reach uniform agreement owing to the difference of sample data and test methods.

In recent years, some scholars have studied the calendar effects in the Chinese stock markets due to the fast development of Chinese economy and gradual opening of Chinese capital markets. Nevertheless, there are some issues on those researches. For example, the sample time lengths are relatively short, and thus the conclusions are less convincing. The great fluctuations in Chinese stock markets in recent two years affect the investment incentives of Chinese investors—the largest stock investor group in the world. Such fluctuations also attract attentions from countries and scholars all over the world. Many empirical researches on Chinese stock markets have been conducted and various results with different methods have been obtained. Therefore, based on past empirical researches, it is difficult to find a relatively stable calendar effects in Chinese stock markets. Hence, we try to use the rolling sample test method and the GARCH model to study the day-of-the-week calendar effects in the Chinese stock markets with all the past 25 years' historical data.

Globalization is the trend of international finance development. The stock markets in the world are correlated and inter-affected. We are interested in whether there are any differences in the pattern of day-of-the-week effects in emerging stock markets and developed stock markets.

The primary objective of this paper is to investigate the day-of-the-week effect on 15 indices from 13 emerging countries and 13 indices from 12 developed countries by using the rolling sample method and GARCH model. Twenty five years' (1990–2016) data of the stock indices in the above 25 countries, i.e., 13 emerging markets: the Shanghai Composite index (SHC), the Shenzhen component index (SZC) and the Small and Middle Enterprise composite index (SMEC) in China; the Merval Index (MERVAL) in ARGENTINA; the BRAZIL IBOVESPA index (IBOV) in BRAZIL; the IPC index (MEXBOL) in MEXICO; the STOCK MKT SELECT (IPSA) in Chile; the RUSSIAN RTS index (RTSI\$) in Russia; the WIG 20 index (WIG20) in Poland; the PRAGUE STOCK EXCH index (PX) in CZECH REPUBLIC; the BIST 100 index (XU100) in Turkey; the S&P BSE SENSEX INDEX (SENSEX) in India; the JAKARTA COMPOSITE index (JCI) in Indonesia; the PSEi-PHILIPPINE SE IDX (PCOMP) in Philippines; the FTSE Bursa Malaysia KLCI (FBMKLCI) in Malaysia; and 12 developed stock markets: the S&P/TSX Composite (SPXT) in Canada; the Dow Jones Industrial index (DOW) and the S&P 500 index (SPX) in USA; the CAC 40 index (CAC) in France; the DAX INDEX (DAX) in Germany; the FTSE MIB index (FTSEMIB) in Italy; the IBEX 35 index (IBEX) in Spain; the SWISS MARKET index (SMI) in Switzerland; the S&P/ASX 200 index (AS51) in Australia; the HANG SENG index (HSI) in Hong Kong; the NIKKEI 225 index (NKY) in Japan; the NZX 50 Gross Index (NZSE50FG) in NEW ZEALAND; the Straits Times Index STI (FSSTI) in Singapore. Furthermore, we detect the day-of-the-week effects using rolling sample intervals with 500, 1000 and 1500 days for every index. In order to measure the performance of the calendar effect, we propose innovatively the calendar effect performance ratio  $q$ . We can easily compare the significance of calendar effect of the returns of different indices in different markets by this ratio.

The layout of the rest of the paper is as follows: Section 2 expounds the empirical research status of the calendar effects of stock and summarizes existing conclusions. Section 3 develops the research methods used in this paper. Section 4 gives descriptive statistics of the data. Section 5 runs empirical studies for the calendar effects of stock market returns in 25 countries mentioned above. Due to space limit, the material on calendar effects for stock indices except those in China, Canada and USA are given in the Appendix at the end of the paper. Section 6 concludes the paper and suggest for future research.

## 2. Literature review

Eddie and Ka (2015) investigate calendar effects, in particular, the Halloween and January effects, on securitized real estate indices of eight economies. Their results show that the Halloween effect is significant in Hong Kong and the US markets, but insignificant in other markets, while the January effect is significant in Hong Kong market only. Yunita and Martain (2012) employ EGARCH model to study the day-of-the-week effects in Indonesia, Singapore and Malaysia stock markets. Their result shows that there is Friday positive abnormal return in Indonesia and Malaysia. In Singapore, there is no Friday positive abnormal return. The study also concludes that there is no Monday negative abnormal return in the three countries. Cross (1973) draws a conclusion that there are higher returns on Fridays and lower returns on Mondays comparing with other trading days in the week by studying average revenue of S&P 500 Index. Donald (1983) finds that the returns on Mondays are lower than other trading days through analyzing the 55-year data of closing quotations for the US stock markets from 1928 to 1982 and the law is also suitable for over-the-counter market and stock portfolio that is classified according to the scale of stocks. Jeffrey and Westerfield (1985) find the same weekly effect in British and Canadian stock markets; however, the returns on Tuesdays are negative and lower than those on Mondays in Australian and Japanese stock markets. Agrawal and Tandon (1994) finds that the returns of 18 stock markets that mainly include the US, Germany and Japan all are higher on Fridays, and there are 12 countries that the returns on Tuesdays are negative.

Cheung and Hu (1997) demonstrate the weekly effect of Asian stock markets. Their research shows that the average returns on Mondays are lowest in the stock markets with five trading days in a week such as Malaysia and Hong Kong, the average returns on Tuesdays are lowest in the stock markets with six trading days in a week such as Korea, Japan and Taiwan, and the returns on the last day of a week are highest. Researchers try to explain the weekly effect from different perspectives. Lakonishok and Levi (1982) believe that the existence of weekly effect is owing to the time lag between

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