The Nepalese Stock Market: Efficient and Calendar Anomalies

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After describing the various forms of efficiency and calendar anomalies observed in many developed and emerging markets according to the existing literature, the present study examines this phenomenon empirically in the Nepalese stock market for daily data of Nepal Stock Exchange Index from February 1, 1995 to December 31, 2004 covering approximately ten years.

Using regression model with dummies, we find persistent evidence of day-of-the-week anomaly but disappearing holiday effect, turn-of-the-month effect and time-of-the-month effect. We also document no evidence of month-of-the-year anomaly and half-month effect. Our result for the month-of-the-year anomaly is consistent to the finding observed for the Jordanian stock market and that for the day-of-the-week anomaly to the Greek stock market .In addition, our finding regarding half-month effect is consistent with the US market. For the rest, we find inconsistent results with that in the international markets. Our results indicate that the Nepalese stock market is not efficient in weak form with regard to the day-of-the-week anomaly but weakly efficient with respect to the other anomalies.

I. INTRODUCTION

In the past two decades, much evidence has accumulated on "calendar anomalies" in developed and emerging markets[1] followed by Fama's (1970) influential paper, "Efficient Capital Markets: A Review of Theory and Empirical Work". Calendar anomalies are empirical results that seem to be inconsistent with maintained theories of asset-pricing behavior (Schweret, 2002). The evidence of a growing number of these has led to a doubt on "Efficient Markets Hypothesis" These include the "seasonals" in stock returns. Stock returns, especially returns on small stock, are on average higher in January than in other months (Haugen & Lakonishok, 1988). Monday returns are on average lower than returns on other days (Cross, 1973; French, 1980; Gibbons & Hen, 1981). Returns are on average higher than the day before a holiday and the first-half-of-the-calendar month (Ariel, 1987; Lakonishok & Smidt, 1988). In addition, returns are on average higher than

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[1] According to the International Finance Corporation, a unit of the World Bank, an emerging equity market is an equity market from a developing country. A developing country is one that has a low income (US$ 783 or less per capita in 1997) or middle income (US$ 783 to 9656 per capita in 1997).

turn-of-the-calendar month (Ariel, 1987; Lakonishok & Smidt, 1988) and the first-third of the calendar month (Kohers & Patel, 1999)[2].

However, there is no study published in an international journal[3] exploring the stock price anomalies in the context of the Nepalese stock market. Therefore, the main objective of this study is to identify the stock price anomalies in the context of one of the emerging stock markets. More specifically, the study examines the existence of all types of seasonalities, namely, the month-of-the-year effect, day-of-the-week effect, holiday effect, half-month effect, turn-of-the-month effect, and time-of-the-month effect in stock returns. In addition we also examine whether our results are analogous to those found in other markets. From another perspective, this study also tests the weak-form of market efficiency.[4]

The study is organized into five sections. The first section commences with the introduction. The second section reviews the literature on market efficiency and calendar anomalies. Section three describes data sources and methodology used for the study. Section four consists of the empirical analysis and findings of the study. The final section presents summary and conclusions.

II. LITERATURE REVIEW

This section consists of two parts. The first part deals with the concept and forms of market efficiency and the second part describes calendar anomalies and its types along with the global findings on these.

Market Efficiency

The concept of efficiency is central to finance. To an economist, efficiency of market has the simple meaning: the allocation of resources generated by the market is said to be efficient (Pareto optimal) if there does not exist an alternative feasible resource allocation which can make some individual better off without making someone worse off (Stiglitz, 1981). In the financial literature, however, the term efficient market takes a slightly different meaning .The two mostly widely applied definitions, both referring to informational efficiency, are the following.

"A capital market is efficient if all the information set ϕ is fully reflected in securities price" (Fama, 1970).

"A market is efficient with respect to information set ϕ_t if it is impossible to make economic profit by trading on the basis of information set ϕ_t. By economic profit, we mean the risk adjusted returns net of all costs" (Jensen, 1978).

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[2] See Fama (1991) and Joshi (2004).

[3]The study by K.C. and Joshi (2004) on "Seasonal Anomalies in Nepalese Stock Market" is the first published literature in national journal. The authors, however did not deal with all types of anomalies.

[4] This is one form of "Efficient Market Hypothesis". Other includes semi-strong form and strong form of market efficiency. For the present case, we define a market as weak-form efficient if it is impossible to achieve abnormal profits by using past prices to formulate buying and selling decisions. These will be discussed under "Literature Review".

According to Stiglitz (1981), market efficiency (informational efficiency) used by financial economists is only the part of overall market efficiency.[5]
This requires that

- The market must provide the correct incentives for gathering the right amount and kind of information,
- The market prices must reflect the information available to the various traders, and
- The firms must be able to convey the information efficiently about their prospects to potential investors (Stiglitz, 1981).

Literature on finance presents three different forms of informational efficiency in stock market: *weak-form, semi-strong form,* and *strong form* based on set of information ϕ_t reflected in security prices (Fama, 1970; Jensen, 1978). In the weak form, the information set ϕ_t is taken to be solely the information contained in the past price history of the market as of time t whereas in the semi-strong form ϕ_t is taken to be all information that is publicly available at time t such as published financial data about companies, government data about economy earning estimates disseminated by companies and security analysis and so on (This includes the past history of prices so that the weak form is just a restricted version of this).Finally, in a *strong form* ϕ_t is taken to be all information known to anyone at time t including even insider information such as imminent corporate takeover plans and extraordinary positive and negative future earning announcements.

The growth in the amount of data and computing power available to researchers, along with the growth in the number of active empirical researchers in finance since Fama's (1970) paper has created an explosion of findings that raise questions about the efficient capital markets (Schweret, 2002). These findings are referred to as anomalies. The next part deals with this aspect.

Calendar Anomalies

Calendar anomalies include the calendar or seasonal regularities such as the month-of-the year effect, day-of-the-week effect, holiday effect, half-month effect, turn-of-the-month effect and time-of-the-month effect[6]. Interestingly, these are not only observed in stock returns, but also in various financial markets such as money, derivative and commodities markets. The existence of these seems to be inconsistent with maintained theories of asset-pricing behavior. They indicate either market inefficiency (profit opportunities) or inadequacies in the underlying asset-pricing model. However, after they are documented and analyzed in the

[5] Others include exchange efficiency and production efficiency.
[6] It is customary in finance to use the terms calendar effects and seasonalities interchangeably but in econometrics, calendar effects are distinguished as one of the possible causes of seasonal fluctuations, which in a wider sense then refer to systematic, but not necessarily regular or unchanging, intra-year movements in economic data (See Sar, 2003).

academic literature, they often seem to disappear, reverse, or attenuate. Thus, there are growing skepticisms on the study providing the evidence of anomalies[7].

First, calendar effects could be a result of data mining. Even if there are no calendar specific anomalies, an extensive search (mining)[8] over a large number of possible calendar effects is likely to yield something that appears to be an "anomaly" by pure chance. Moreover, Merton (1987) points out that "economists place a premium on the discovery of puzzles, which in the context at hand amounts to finding apparent rejections of a widely accepted theory of stock market behavior" (cited by Sullivan, Timmerman & White,1998). Another observation that points to data mining as a plausible explanation is that theoretical explanations have only been suggested after the empirical "discovery" of the anomalies.

The second is the data-snooping phenomenon[9], an attempt to detect regularities by many academicians and investors focusing on common stock price indexes (more severe for US markets). Data snooping imparts a "bias" in the sense that it affects inferences in an undesirable way (Lo & MacKinlay, 1990).

Thus, the findings of systematic seasonal patterns in stock returns leave us with a conundrum: do the apparent regularities in stock returns really imply a rejection of simple notions of market efficiency, or are they just a result of a large, collective data-snooping exercise? Many researchers express awareness of this problem. Lakonishok and Smidt (1988), for example, comment on the seasonal regularities in this way: "However, it is at least possible that these new facts are really chimeras, the product of sampling error and data mining". Grouped by calendar frequency, the researchers have reported the following anomalies.

Month-of-the-Year Effect

This effect states that return on common stock is not the same for all the months of the year. Empirical studies conducted in the stock market of US have found that the statistically significant positive returns to common stocks occur in January while significant negative returns to common stocks occur in December. Thus, the January effect is of phenomenon in these countries.

Wachtel provides the earliest evidence of the abnormal stock returns in January in 1942 for US stock markets. Rozeff and Kinney (1976) make the first formal investigation on the phenomenon, and find that returns on an equally weighted index of NYSE stocks were much higher in January than in other months of the year. Banz (1981) and Reinganum (1981) both provide report of a significant negative relationship between stock returns and the size of the issuing firm as measured by the total market value of outstanding equity. Keim (1983) investigates the interaction of the seasonal and size effects and finds that approximately half of

[7] See Lakonishok and Smidt (1988); Lo and MacKinlay (1990)**;** Fama (1991); Sullivan, Timmerman and White (1998); Schweret (2002); Sar (2003); Hansen and Lunde (2005) for excellent review on anomalies.

[8] A popular phrase is that "the data has been tortured until it is confessed".

[9] We will also discuss this issue later under 'Data and Methodology' section.

the annual difference between the rates of return on small and large firms occurs in the month of January. Blume and Stambaugh (1983) apply a correction for the return measurement bias that results from using reported closing prices and shows virtually that all of the size effect occurs in the month of January. Various hypotheses (Chen & Singal, 2001) have been formulated to explain the anomaly of January effect. We provide a brief description of these and also the empirical study on it.

Tax-Loss Selling hypothesis

This hypothesis was first suggested by Branch (1977). According to it, investors, wanting to realize capital losses in current tax year, create a downward price pressure at the year end (December) on securities that have previously experienced negative return. Subsequently, at the beginning of the new tax year (January), this selling pressure is relieved and the affected securities earn excess return as their prices rebound. Furthermore, because small firms' stock returns are more volatile than large firms' returns, small-firm stocks are more likely to have generated usable tax losses and therefore be candidates for tax loss selling (Brauer & Chang, 1990). Evidence in support of this hypothesis is provided by Jones, Lee and Apenbrink (1991); Poterba and Weisbenner (2001); Chen and Singal (2001); Dai (2003). Contradicting evidences are also abundant. Brown et. al (1983) in Australia and Kato and Schallheim (1985) in Japan report significant January effects, even though January is not the beginning of the tax year.

The Window-dressing Hypothesis

According to the window-dressing hypothesis, developed by Haugen and Lakonishok (1988), institutional managers are evaluated based on their performance and their investment philosophy. To improve their performance, the institutions buy both risky stocks and small stocks but sell them before the end of the year so that they do not show up in their year-end holdings. At the beginning of the following calendar year (in January), investment managers reverse the process by selling winners, large stocks, and low risk stocks while replacing them with small and risky stocks that typically include many past losers.

The window dressing hypothesis represents an alternative but not necessarily mutually explanation for the month-of-the-year effect (January effect). However, the two hypothesis are difficult to differentiate because they both rely on year-end selling pressure in losing stocks, and both predict a January effect concentrated at the turn of the year. One difference is that the tax-loss selling hypothesis implies no return seasonality prior to the introduction of capital gain taxes (Jones, Lee & Apenbrink, 1991).

Differential Information Hypothesis (Information Release Hypothesis)

This hypothesis relies on how variation in the quantity of information available for different firms may result in different returns or levels of risk. According to Rozeff and Kinney (1976), the excess January returns are the effect of significant information releases that occur in the first few days of January. Barry and Brown (1985) report that relatively information-poor securities have more systematic risk than their information-rich counterparts. Suppose, in addition, small-capitalization stocks are information-poor while large capitalization stocks are information-rich. The surfeit of news associated with year-end reporting would increase the information richness of small stocks by relatively much more than it would that of the already informationally affluent large stocks. Consequently, small stocks would react more strongly to the increased news of January by generating larger returns than large stocks. Penman (1987) hypothesizes that firms release good news as soon as possible, towards the beginning of each quarter. But, they delay release of bad news to the second half of the quarter. According to him, if the market reacts mechanically to news, then stocks should earn abnormal returns in the first few days of each quarter. He finds support for this hypothesis by observing the release of good news at the beginning of quarters 2 to 4. However, he finds a weaker effect for the 1st quarter that includes January. Clarkson and Thompson (1988) report evidence corroborating risk reductions in response to information increases. Arbel and Strebel (1982) indicate that small-capitalization stocks tend not to be heavily researched by security analysts.

Market Microstructure Biases

Market microstructure biases are most likely to plague stocks with low prices and low capitalization, exactly the type that meet the criteria for tax-loss selling. Researchers have shown that market microstructure biases (bid-ask bounce, bid-ask spreads) might explain the January effect and that transaction costs make it non tradable. Ball, Kothari, and Shanken (1995) suggest that low priced stocks trading within a relatively wide bid-ask interval may explain the effect. Cox and Johnston (1998) show that stocks with prices greater than $10 do not exhibit positive returns in January. Bharadwaj and Brooks (1992) also find that it is a low price effect.

Evidence from Foreign Markets

The tax-loss explanation of the January effect has been challenged by studies of foreign stock markets where the January effect is observed though the host countries may not have a December-end tax year (Agrawal and Tandon, 1994). Brown *et al.* (1983) study Australian stocks where the tax year-end is June 30. They find seasonals in December-January and July-August with the largest effects in January and July. Berges, McConnell, and Schlarbaum (1984) study the Canadian stocks where December is the tax year-end. They find a January seasonal

prior to 1972 when Canada had no capital gains tax. One explanation for the existence of a January effect in countries without December-end tax year is that foreign investors induce a January seasonal in those countries. If investors from countries with a December-end tax year have significant equity holdings in foreign countries then the January seasonal would be observed due to trading by those investors.

Few studies also reveal the presence of month-of-the-year effect of stock returns for other countries' markets. Nassir and Mohammad (1987) provide evidence of Malaysia where the average January returns were significantly positive and higher than in other months during the period 1970-1986. Balaban (1995) reports January effect for Turkey although it does not have any capital gain tax. Furthermore, Ho (1999), using daily returns for the period January 1975 to November 1987, find that six out of eight emerging Asian Pacific stock markets exhibit significantly higher daily returns in January than in other months. Fountas and Segerdakis (1999) test for seasonal effects in stock returns (the January effect anomaly) using monthly stock returns in eighteen emerging stock markets for the period 1987-1995. They find very little evidence in favor of this effect in the emerging markets. Pandey (2002) also reports the existence of January effect for India although January is not the first-month of tax year. Maghayereh (2003) find no evidence of monthly seasonality as well as January effect in the Amman Stock Exchange (Jordan). However, K.C. and Joshi (2004) find October effect for Nepalese stock market, against the tax loss selling hypothesis.

Day-of–the-Week Effect

The day-of-the-week effect (also called as weekend effect or Monday effect) indicates that the average daily return of the market is not the same for all the days of the week, as we would expect on the basis of the efficient market theory. Empirical studies conducted in the stock market of US, England and Canada have found that the statistically significant positive returns to common stocks occurs on Fridays while significant negative returns to common stocks on Mondays but for Japan, France, Australia and Singapore, the significant negative returns appear on Tuesdays. Other studies also show the day of week effect for the emerging markets. Two hypotheses have been formulated by many researchers in trying to explain the day of the week anomaly:

(a) *The Calendar Time Hypothesis*: According to this hypothesis, the return generating process is continuous. This means that Monday's average return will be different than the other days' average returns. The reason for this is that Monday's average return is estimated from the closing price on Friday until the closing price on Monday. Hence, Monday's average return will be three times higher than the average returns of the other working days (French, 1980; Lakonishok & Levi, 1982).

(b) *The Trading Time Hypothesis:* According to this hypothesis, the returns of common shares are generated during a transaction. This means that the average

return of shares will be the same for all the weekdays (Monday through Friday), because each day's return represents one day's investment (French, 1980; Lakonishok & Levi, 1982).

The existence of weekend effect is considered to be inconsistent with the calendar time hypothesis and the trading time hypothesis (Sar, 2003).

Cross (1973) and French (1980) provide the earliest evidence of the weekend effect in US stock markets. Spawned by the work of them, numerous studies searched for satisfactory explanations to rationalize such puzzling discovery of the persistent negative Monday (or weekend) returns.

Lakonishok and Levi (1982) attribute the effect to the delay between trading and settlement in stocks and in clearing check which states that effect of delay in payments on expected measured rates of return of stock due to holidays and normal weekends causes lower return on Monday. Keim and Stambaugh (1984) introduce the bid-ask-spread bias as a possible explanation for the effect. Gibbons and Hess (1981) and Rogalski (1984) on the other hand introduce measurement error as an explanation. Liano and Gup (1989) report that Monday return patterns tend to be dissimilar in different stages of the business cycle. They find stronger negative Monday returns during economic contractions than during economic expansions. Barone (1989) finds that the largest drop in stock prices occur on the first two days of the week and are more pronounced on Tuesday in Italy. Damodaran (1989) concludes that earnings and dividend announcements on Fridays are much more likely to contain reports of declines and to be associated with negative abnormal returns than those on other weekdays. While Friday reports elicit negative average returns for firms in all size classes, announcements by smaller firms have more negative returns associated with them on the following trading day, suggesting that they are more likely to release reports after close of trading or that prices adjust more slowly to the information in these reports. In addition, he finds that a comparison of the average returns by weekday, with and without the Friday announcements explains a surprisingly small proportion (3.4 percent) of the weekend effect.

Lakonishok and Maberly (1990), Sias and Starks (1995) and Kamara (1995) document that trading behavior, especially selling activity, tends to increase trading activity on Mondays. Sias and Starks (1995) report that the weekend effect returns and volume patterns are more pronounced in securities in which institutional investors play a great role. Kamara (1995) assumes that increased institutional trading activity is responsible for the Monday seasonal returns. Wang, Li and Erickson (1997) report that the day-of-the-week effect occurs primarily in the last two weeks (fourth and fifth weeks) of the month. They provide two possible explanations for this. The first explanation is based on the correlation between the Friday return and the Monday return. The second explanation relates negative Monday return to the expiry date of stock options. Draper and Paudyal (2002) report for UK that Monday effect is caused by a combination of various factors, especially the fortnight of the month, account settlement day, ex dividend day, arrival of (bad) news on Fridays, trading activity and bid-ask spread. Further when

these factors are controlled, the average Monday return becomes insignificantly different from the average return of other days of the week thus providing support for the trading time hypothesis. Katerina, Demeteres, George (2002) find negative returns for Greek on Thursdays instead of Mondays or Tuesdays as it has been observed in most of the other markets. Brus, Liu and Schulman (2003) report that the Monday returns patterns are different between the pre-and post-1988 sub-periods. In other words, 'traditional' weekend effect documented in the previous studies has been reversed. They find that Monday returns tend to be positive and greater than the returns on other days of the week in the post-1988 period. However, they show similar Monday returns pattern between broad indices and industry indices (i.e., the 'traditional' and the 'reverse' weekend effects were observed for broad stock indices as well as in most industry indices). Further they observe that the similarity in Monday returns between broad stock indices and industry indices still persists after classifying the data by month of the year and by week of the month. From these results they suggest that the sources behind the weekend effect (traditional and reverse) are economic events that affect all sectors of the economy rather than industry-specific factors that impact on only a few industries. Chen and Singal (2003) show that unhedged speculative short sellers (as distinct from hedged short sellers) are partly responsible for the weekend effect. Empirical study for other markets show that day-of-the-week-effect also exists for Istanbul Stock Exchange (Balaban, 1995), Shanghai Composite Index (Zhou, 2003) and Amsterdam Stock Exchange (Sar, 2003). Agrawal and Tandon (1994) report evidence of a weekend effect in stock returns in nine countries. Choudhary (2000) reports the day-of-the-week effect for seven emerging Asian stock markets (India, Indonesia, Malaysia, Philippines, South Korea, Taiwan and Thailand). Tong (2000) examined twenty-three equity market indices and find that the negative Friday is, in general, important to the Monday effect (cited in Joshi,2004).

Holiday Effect

The consistency of the pattern around the weekend closing suggests that it may apply to any gap in trading. Empirical studies in US and other countries have reported high rates of return before holidays. For example, Roll (1983) observe high rates of return on the last trading day of December and Lakonishok and Smidt (1988) report high rates of return around Christmas. Ariel (1985) finds pre-holiday daily rates of return of 0.53 percent and 0.36 percent for the Center for Research in Security Prices (CRSP) equal-weighted index and value-weighted index, respectively, for the period 1963 to 1982. He reports that for the value-weighted index, the eight holidays per year account for 38 percent of the total annual rate of return (cited by Lakonishok & Smidt, 1988). Lakonishok & Smidt define a holiday as a day when trading would normally have occurred but did not. Further, the days are classified as pre-holiday, post-holiday, or regular (neither) without regard to the day of the week. Pre-holidays are those days which have at least one preceding day as trading day, but at least one succeeding day as holiday. Post-holidays include

those days which have at least one preceding day as holiday, but at least one succeeding day as trading day. Using Dow Jones Industrial Average (DJIA) of ninety years data they find that the pre-holiday rate of return is 23 times larger than the regular daily rate of return, and holidays account for about 50 percent of the price increase in the DJIA.

Researchers have provided three main explanations for the existence of holiday effect (Meneu & Pardo, 2003).The first one is the existence of a relationship between this effect and other calendar anomalies. Lakonishok and Smidt (1988), Ariel (1990) and Liano *et al.* (1992) are among the first researchers to attempt to explain the holiday effect by appealing to other calendar anomalies such as the day-of-the–week effect, the monthly effect and the turn-of-the-year effect. Their results indicate that the high returns observed on pre-holidays are not a manifestation of other calendar anomalies (cited in Joshi, 2004).

Another explanation is based on the existence of a link between the pre-holiday effect and the small firm effect. Pettengill (1989) reports that small firms outperform large ones on both January and non-January pre-holidays but Ariel (1990) and Kim and Park (1994), on the contrary, find that, after controlling for the day-of-the-week effect and the pre-New-Year's-Day effect, the size effect is not present in mean returns on pre-holidays(cited in Meneu and Pardo,2003).

The last explanation of the pre-holiday effect is based on a set of different and systematic trading patterns. Keim (1983 suggests that the pre-holiday return may be, in part, due to movements from the bid to the ask price. Ariel points out that pre-holiday strength can be attributed to short-sellers who desire to close short but not long positions in advance of holidays or, simply, to some clientele which preferentially buys (or avoids selling) on pre-holidays. Meneu and Pardo (2003) observe that the pre-holiday effect for Spanish Stock Exchange could be due to the reluctance of small investors to buy on pre-holidays, which produces an increase in the average size of bid orders.

Other studies that provide the evidence of holiday effects include Barone (1989) for Italian Stock market; Cadsby and Ratner (1992) for Canada, Japan, Australia and Hong Kong but not for the European markets; and Jaleel (2003) for Sri Lanka (cited in Joshi, 2004).

Half-Month (HM) Effect

The tendency of common stock returns for the second half-month to be significantly below the first half of calendar month is labeled as the half-month effect (also called as semi- month effect). With regard to the first-half-month and second-half-month, there are two lines of accepted definition. Ariel's (1987) definition of the first part of the month includes the last trading day of the previous month to the first eight trading days of the month, a total of nine trading days, while the last half of the trading month consists of nine trading days before the last trading day of the month. Using the CRSP value-weighted stock indices over the period 1963-1981, he reports an average rate of return of 0.826 percent for the

value-weighted CRSP Index during the first part of the month and a negative average rate of return, -0.182 percent, during the second part of the month, i.e., positive rates of return occur in the stock market only during the first half of each month (cited in Lakonishok & Smidt, 1988). Lakonishok and Smidt (1988) define the first-half-of-the-month as the first through the fifteenth calendar day of the month, if it is a trading day, or if not, through the next trading day. The last-half-of-the-month consists of the remaining days. They provide only mild support for the idea that rates of return are larger in the first-half –of-the-month than in the last-half. Further they report that Ariel's evidence of a higher average rate of return during the first-half-of-the-month appears to be partly the result of idiosyncratic characteristics of the period he studied and partly the result of including the last trading day of the previous month as part of the first-half –of-the-month.

Jaffe and Westerfield (1989) find half-month effect for Australia and inverted half-month effect for Japan but no existence of effect for Canada and the United Kingdom. Liano, *et al.* (1992) report that economic cycles have impact on the half-month effect in over-the-counter (OTC) stocks during the period 1973-1989, in that the half-month effect only existed in the periods of economic expansion but not during periods of economic contractions. Wong (1995) further extends the study to five developing stock markets of Hong Kong, Taiwan, Thailand, Malaysia and Singapore. There is no such effect in Singapore, Malaysia, Hong Kong and Taiwan. Thailand exhibited a reverse half-month effect in the second period but no half-month effect in the first and third periods. Boudreaux (1995) investigate the half-month effect in the stock markets of seven countries, namely, Denmark, France, Germany, Norway, Singapore/Malaysia, Spain and Switzerland .The half-month effect is found in three countries, Denmark, Germany and Norway while a significantly inverted half-month effect is found in Singapore/Malaysia. Balaban and Bulu (1996) do not find the half-month effect for Turkey whereas Mills, *et al.* (2000) find a half-month effect in Greece. Various explanatory factors, including pre-test bias, biased data, mismatch between calendar and trading time, dividend effect, manifestation of the January effect and small firms effect have been attributed to this.

Turn-of-the-Month (TOM) Effect

This indicates that average daily rate of returns on common stock around the turn-of-the-month is different to that of average rate of return of remaining days of the calendar month. There are two accepted lines of definition regarding the turn-of-the-month days. These include that of Ariel (1987) and Lakonishok and Smidt (1988). Ariel defines turn-of-the-month days to include the last trading day of the previous month and the first four trading days of the month. He analyzes the value weighted CRSP index for 19 years period (1963-1981) and provides some evidence that days around the turn-of-the-month (-1 to +4) exhibit a high rate of return. Lakonishok and Smidt (1988) include the last trading days of the previous month and only the first three trading days of the month. They find the TOM (-1 to +3)

effect for Dow Jones Industrial Average (DJIA). Cadsby (1989) finds similar results for Canada. Jaffe and Westerfield (1989) report the reverse TOM effect in Japanese Stock Market In a study of stock indices of 10 countries over different time periods until the late 1980s, Cadsby and Ratner (1992) report the TOM effect in U.S., Canada, Switzerland, West Germany ,United Kingdom and Australia but no such effect in Japan ,Hong Kong, Italy, and France. Agrawal and Tandon (1994), in their study of stock markets of eighteen countries also find evidence of the TOM effect internationally in the 1970s but fading effect in the decade of the 1980s (cited in Joshi, 2004).

Others have also uncovered variations of the TOM period. Hensel and Ziemba (1996) utilize five days period inclusive of the last two trading days of the previous month, i.e., –2 and +3 in a study of turn-of-the-month pattern in U.S. stock market and Ziemba (1991) uses seven-day period inclusive of the last five trading days of the previous month in a study of turn-of-the-month pattern in Japan, i.e.,–5 to +2 (cited by Compton, 2002). One of the hypotheses put forward to explain the TOM effect is liquidity trading—that is the demand of individual investors rises towards the end of the month in connection with the payment of salaries. Another hypothesis is portfolio rebalancing which says that institutional investors bunch their purchases at the end of the month because of the improvement this produces in the performances published in the specialized press as these are normally calculated on the basis of end-of-the-month price (Barone, 1989).

Time-of-the-Month Effect (Third Month Effect)

This monthly anomaly was first identified by Kohers and Patel (1999). They split a calendar month into three segments. The first segment extends from the 28th day of the previous month to the 7th day of the month, the second segment extends from the 8th day to the 17th day of the month and the last segment consists of the other days, that is, the 18th day to the 27th day of the month. Using the Standard & Poor's Index during the period January 1960 - June 1995 and the NASDAQ Index during the period January 1972 - June 1995, they report that the returns are highest during the 'first third', experience a drop during the 'second third', and are lowest, and in most cases negative, during the 'last third' of a month. Further, they indicate that this pattern remained remarkably consistent for the two indices examined. It also held up well over the business cycles and many different sub periods tested. Lian (2002) studies this effect for six countries namely Australia, Malaysia, US, Hong Kong, Japan and Singapore. He reports that effect was a past phenomenon in Australia and Hong Kong but a recent phenomenon in the US.

III. Data Source and Methodology

The first part of this section describes Nepal Stock Exchange Index which is the basis for our study and second part describes the methodology used for the study.

Nepal Stock Exchange (NEPSE) Index

The Nepal Stock Exchange Index is a value weighted index of all shares listed at the Nepal Stock Exchange and calculated once a day at the closing price. It is available on a daily basis from January 23, 1995 only, although Nepal Stock Exchange (NEPSE) opened its trading floor through licensed member on January 13, 1994. Our sample period however, starts from February 1, 1995 and ends in December 31, 2004 covering approximately ten years.

The use of index provides a measure of general market trend (Keimp & Reid, 1971) and is customarily justified by the statement that calendar anomalies are more easily detected in market indices or large stock portfolios than *n* individual share prices (Officer, 1975; Boudreaux, 1995; Pandey, 2002). Further it is more appropriate to use the daily index. Among the indexes, the value weighted index is preferable to the equally weighed index since the later places greater weight on small firms and potentially would magnify anomalies related to small firms (Pandey, 2002).

The NEPSE index is available for everyday when the market has been opened. Beginning on August 29, 1999, Sunday trading sessions were eliminated .The permanent elimination of Sunday trading sessions provides a convenient point for partitioning the data into sub periods. The first sub period starts from February 1, 1995 to August 31, 1999 and the second covers the period from September 1, 1999 to December 31, 2004 (hereafter indicated as pre-1999 & post-1999 respectively).

To facilitate making judgments about the persistence of characteristics of data we report the findings for the entire period (hereafter indicated as 1995-2004), pre-1999 and post-1999 and in some cases for individual years.

With regard to the finding of anomalies, researchers are more concerned about data snooping phenomenon. A term used by Aldous (1989), it is the attempt to both discover and test hypotheses using the same data (cited in Lo et al., 1990). The statistical tests routinely used in financial economics are usually ineterpreted as if they were being applied to new data. But the data available in finance are seldom new. The dangers of data snooping are less in our case since only one study had been conducted utilizing nine years data.

Methodology

Daily logarithmetic returns on NEPSE were calculated from the NEPSE index for the period from February 1, 1995 to December 31, 2004 comprising of 2345 trading days using the following equation.

$$R_t = 100 * \text{Ln} (NEPSE_t / NEPSE_{t-1})$$

where R_t is the continuously compounded rate of change in the stock market index. $NEPSE_t$ is the stock market index at time t and $NEPSE_{t-1}$is the stock market index at time t-1. Ln is the natural logarithm. First suggested by Osbrone (1959) , the

lognormal probability distribution of price change is more popular and used by many other researchers (cited in Kemp & Reid,1971). We compute continuously the compounded returns, rather than arithmetic returns, because continuously compounded returns are additive and their distribution "follows" the normal distribution more closely than arithmetic returns (Lauterbach and Uncar, 1995).

To investigate the seasonal patterns, each return observation is coded according to its month relative to the year, day relative to the week, day relative to a holiday, day relative to the half-month, day relative to the turn-of-the-month, and day relative to the time-of-the-month Then each of recognized seasonal effects is tested individually, using regression equations with dummy variable(s). This type of model can have an admixture of qualitative (dummy) and quantitative variable or only qualitative variable as explanatory variable. We used the latter one.

IV. Empirical Analysis and Findings

This section consists of the analysis and findings related to various anomalies for the Nepalese stock market.

Month-of-the-Year Effect

Table 1 provides the mean, standard deviation, *t*-statistic (in parenthesis), percentage positive and number of months when the 119 mean monthly returns are categorized by the calendar months for 1995-2004 and for the four sub periods[10]. One can see that the mean return for February and December is negative regardless of the periods considered. However, December is the only month with mean return significantly different from zero for post 1999 (mean=-0.1347 percent, *t*-statistic= -2.35) and post-tax (mean= -0.1730 percent, *t*-statistic =-2.37).The negative and significant mean return observed for December is consistent to the U.S. markets. In contrast to this, we find that the mean return for June and October to be both positive for the entire period. The result for the sub-periods is consistent with that for the total period. Not surprisingly, the magnitude of the October mean return is greater for the entire period and three of the sub-periods, but only significant for the entire period (mean=0.2070 percent and *t*-statistic = 2.81) and pre-1999 period(mean = 0.1978 percent, *t*-statistic = 2.87) and pre-tax period (mean = 0.2775 percent and *t*-statistic = 2.53) at conventional level of significance. The exception is post-tax period where April has the highest the insignificant 0.1803 percent mean return (*t*- statistic=1.04). The higher and significant positive mean return observed for October is inconsistent to U.S. markets**.**

[10] Sub-periods are based on the elimination of Sunday trading session and on the imposition of capital gain tax. Total sub periods are 2*2=4. The division of sub period on the basis of imposition of capital gain tax provides the explanation for the existence of the January effect in relation to tax-loss selling hypothesis.

With regard to the other months, we find no specialty. Table 1 also reports that there does not exist risk return relationship for any of the calendar months of the year irrespective of the periods considered; for example, standard deviation of mean stock return for February is highest for most of the period under study (except pre-1999) whereas average return for that month is negative for all period.

To make a further test of the effect, the following regression equation with dummies is carried out (Pandey, 2002; Maghayereh, 2003)

$$R_t=\beta_0+ \beta_1 d_{2t}+ \beta_2 d_{3t}+ \beta_3 d_{4t}+ \beta_4 d_{5t}+ \text{--------}+ \beta_{11} d_{12t}+ \varepsilon_t$$

where, R_t is the mean return of the stock index on month t. The variable d_{it} takes a value of one if the return occurs on *i* month and zero if the return occurs on the month other than *i* month (d_{2t} =February, d_{3t} =March, d_{4t} =April, d_{5t} =May, d_{6t} =June, d_{7t} =July, d_{8t} =August, d_{9t} =September, d_{10t} =October, d_{11t} =November, d_{12t} =December). From basic econometrics we know that the coefficient β_0 measures the mean return for January and the coefficients β_1 through β_{11} measure the difference between the mean return for each month of the year and the mean return for January. ε_t is the error term. The regression model is tested for the null hypothesis H_0: $\beta_1= \beta_2= \beta_3= \beta_4= \text{------}\beta_{11}= 0$ against the alternative hypothesis that mean return for each month of the year is not equal. The significance of coefficient of at least one dummy variable confirms that there is no equality of mean returns across the calendar months of the year. This approach is equivalent to regressing the returns on twelve monthly dummies, with no constant term, and testing for the equality of all parameters.

Table 2 reports the regression results for the entire period and sub periods. The results support our null hypothesis that the mean returns for each month of calendar year are equal. The coefficient of dummy variable d_{10t} (β_9) is higher and insignificantly different from zero for all periods at conventional level of significance. The intercept term β_0 indicating the mean return for January reverses in sign for pre and post sub periods. More important, the difference between the returns for December and January represented by β_{11} are negative and insignificant for all of the periods considered. These regression outputs reveal no discernable month-of-the-year anomaly (and January effect hypothesis). This implies that the average return in January does not significantly exceed the average return over the rest of the year. Our results also suggest that there is no difference in returns across months. These results are consistent to that obtained for the emerging market, namely, Jordan (Maghayereh, 2003).

TABLE 1. Summary Statistics for the Month-of-the-Year Effect in the Nepalese Stock Market

Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Whole
Pre-1999													
Mean	0.0478%	-0.0928%	0.0308%	-0.1388%	0.0280%	0.0792%	0.0100%	0.0226%	0.0358%	0.1978%	0.0920%	-0.1333%	0.0108%
t-statistic	(1.19)	(-0.87)	(0.28)	(-1.44)	(0.29)	(0.98)	(0.14)	(0.39)	(0.35)	(2.87*)	(0.60)	(-1.23)	(0.39)
Standard Deviation	0.0805%	0.2377%	0.2453%	0.2149%	0.2188%	0.1815%	0.1581%	0.1297%	0.2041%	0.1376%	0.3051%	0.2162%	0.2042%
Percentage Positive	75.00%	20.00%	60.00%	40.00%	40.00%	60.00%	40.00%	60.00%	50.00%	100.00%	25.00%	25.00%	50.00%
Number of Months	4	5	5	5	5	5	5	5	4	4	4	4	54
Post-1999													
Mean	-0.0168%	-0.2606%	-0.0492%	0.1306%	-0.0338%	-0.0296%	0.0256%	0.1296%	-0.0027%	0.2132%	0.0742%	-0.1347%	0.0059%
t-statistic	(-0.14)	(-0.82)	(-0.32)	(0.95)	(-0.32)	(-0.40)	(0.34)	(0.53)	(-0.03)	(1.78)	(0.92)	(-2.35*)	(0.15)
Standard Deviation	0.2615%	0.7073%	0.3485%	0.3082%	0.2347%	0.1674%	0.1687%	0.5474%	0.1896%	0.2935%	0.1974%	0.1404%	0.3246%
Percentage Positive	80.00%	40.00%	100.00%	60.00%	40.00%	60.00%	60.00%	80.00%	66.67%	100.00%	50.00%	33.33%	64.06%
Number of Months	5	5	5	5	5	5	5	5	6	6	6	6	64
Pre-Tax[a]													
Mean	0.0418%	-0.1621%	0.0853%	-0.0831%	-0.0490%	0.0249%	0.0227%	0.1725%	0.0808%	0.2775%	0.1543%	-0.1082%	0.0331%
t-statistic	(0.65)	(-0.76)	(1.00)	(-0.83)	(-0.55)	(0.37)	(0.36)	(1.10)	(0.98)	(2.53*)	(1.47)	(-1.46)	(1.02)
Standard Deviation	0.1580%	0.5627%	0.2252%	0.2646%	0.2376%	0.1768%	0.1670%	0.3851%	0.2029%	0.2684%	0.2576%	0.1815%	0.2877%
Percentage Positive	33.33%	28.57%	42.86%	42.86%	42.86	14.29%	28.57%	66.67%	50.00%	83.33%	66.67%	16.67%	42.31%
Number of months	6	7	7	7	7	7	7	6	6	6	6	6	78
Post-Tax													
Mean	-0.0480%	-0.2107%	-0.2297%	0.1803%	0.1047%	0.0247%	0.0063%	-0.0685%	-0.0895%	0.1013%	-0.0283%	-0.1730%	-0.0378%
t-statistic	(-0.29)	(-0.82)	(-1.17)	(1.04)	(1.41)	(0.21)	(0.07)	(-0.37)	(-1.71)	(1.52)	(-0.39)	(-2.37*)	(-1.00)
Standard Deviation	0.2840%	0.4433%	0.3389%	0.3002%	0.1285%	0.2073%	0.1526%	0.3714%	0.1046%	0.1331%	0.1448%	0.1461%	0.2420%
Percentage Positive	33.33%	33.33%	33.33%	66.67%	100.00%	33.33%	33.33%	75.00%	25.00%	25.00%	50.00%	0.00%	46.34%
Number of Months	3	3	3	3	3	3	3	4	4	4	4	4	41
1995-2004													
		-	-	-	-							-	
Mean	0.0119%	0.1767 %	0.0092 %	0.0041%	0.0029%	0.0248%	0.0178 %	0.0761 %	0.0127%	0.2070 %	0.0813 %	0.1341%	0.0087%
t-statistic	(0.18)	(-1.11)	(-0.10)	(-0.05)	(-0.04)	(0.45)	(0.36)	(0.63)	(0.22)	(2.81**)	(1.12)	(-2.60**)	(0.35)
Standard Deviation	0.1943%	0.5053%	0.2872%	0.2879%	0.2164%	0.1743%	0.1543%	0.3793%	0.1851%	0.2329%	0.2297%	0.1629%	0.2739%
Percentage Positive	55.56%	30.00%	60.00%	50.00%	50.00%	40.00%	40.00%	70.00%	50.00%	90.00%	50.00%	20.00%	50.42%
Number of Months	9	10	10	10	10	10	10	10	10	10	10	10	119

Notes*: a)* Capital gain tax has been effective from July 17, 2001. But we used August 1, 2001 as a dividing line for sub periods pre-tax (February 2, 1995 to July31, 2001) and post-tax (August 1,2001 to December 31,2004) .The rationale behind this is to avoid the appearance of July as a month in both sub periods. In addition to this we want to have uniform number of observations for each month of calendar year. The division of sub period on the basis of imposition of capital gain tax provides the explanation for the existence of the month-of- the- year effect in relation to tax-loss selling hypothesis.
b) The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995-2004 (*t*-statistics are in parenthesis). From the daily return data we first compute the monthly arithmetic mean returns for each month of the calendar year. The summary statistics are then computed for all sub periods and for entire period.

* Significant at the 0.10 level for two-tailed test. ** Significant at the 0.05 level for a two tailed test.

TABLE 2. Regression Coefficients for the Month-of-the-Year Effect in the Nepalese Stock Market

Period	β_0	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	β_9	β_{10}	β_{11}	Adjusted R^2	F
Pre-1999	0.0477%	-0.1406%	-0.0169%	-0.1866%	-0.0197%	0.0315%	-0.0377%	-0.0251%	-0.0120%	0.1500%	0.0443%	-0.1810%	-0.03%	1.00
	(0.47)	(-1.03)	(-0.12)	(-1.37)	(-0.15)	(0.23)	(-0.28)	(-0.19)	(-0.08)	(1.05)	(0.31)	(-1.26)		
Post-1999	-0.0168%	-0.2438%	-0.0324%	0.1474%	-0.0170%	-0.0128%	0.0424%	0.1464%	0.0141%	0.2300%	0.0910%	-0.1179%	-3.85%	0.79
	(-0.11)	(-1.17)	(-0.15)	(0.70)	(-0.08)	(-0.06)	(0.20)	(0.70)	(0.07)	(1.15)	(0.45)	(-0.59)		
Pre-Tax	0.0418%	-0.2040%	0.0435%	-0.1250%	-0.0908%	-0.0170%	-0.0191%	0.1307%	0.0390%	0.2357%	0.1125%	-0.1500%	3.95%	1.29
	(0.36)	(-1.30)	(0.28)	(-0.80)	(-0.58)	(-0.11)	(-0.12)	(0.80)	(0.24)	(1.45)	(0.69)	(-0.92)		
Post-Tax	-0.0480%	-0.1627%	-0.1817%	0.2283%	0.1527%	0.0727%	0.0543%	-0.0205%	-0.0415%	0.1493%	0.0198%	-0.1250%	-3.39%	0.88
	(-0.34)	(-0.81)	(-0.90)	(1.14)	(0.76)	(0.36)	(0.27)	(-0.11)	(-0.22)	(0.79)	(0.11)	(-0.66)		
1995-2004	0.0119%	-0.1886%	-0.0211%	-0.0160%	-0.0148%	0.0129%	0.0059%	0.0642%	0.0008%	0.1951%	0.0694%	-0.1460%	2.79%	1.31
	(0.13)	(-1.52)	(-0.17)	(-0.13)	(-0.12)	(0.10)	(0.05)	(0.52)	(0.01)	(1.57)	(0.56)	(-1.18)		

Note: The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995 to 2004 (*t*-statistics are in parenthesis).

Day- of- the-Week Effect

Table 3 provides the mean, standard deviation, *t*-statistic (in parenthesis), percentage positive and number of months when the 2,344 daily returns are categorized by the day-of – the-week for 1995-2004 , two sub periods and for individual years. The results indicate that for the full sample period the average Sunday return (mean= 0.0802 percent, *t* statistic =1.81) is significant at 10 percent level of significance. The pattern for this day remains similar for sub-period of pre-1999[11]. Probably, this is because of the elimination of Sunday trading sessions. In contrast to this, we find no significant mean return for any days of week for sub period of post-1999. On an individual year basis, we find that all days are significant (level of significance differs) at least once. More important, our results also remain consistent with that of total period results but the average return is significant only for year 1999 (mean=0.2602 percent , *t* statistic =2.18).In addition we also observe that Wednesday and Thursday follow a identical pattern as is Monday and Tuesday for most of the period. The exception is year 1997 and 2004 for the former and 1995, 1998 and 2002 for the latter. Friday , the day for which abnormal returns are observed in international market provides no consistent results in our case[12].One can also see that when Monday is the first trading day of the week it is significantly positive but when it is second day of trading sessions it is significantly negative. Accordingly, when Thursday is the last trading day it is insignificant at conventional level of significance but when it is the second last day of trading session it is significantly different from zero for 2000 (mean=0.4018 percent, *t*-statistic=4.11), 2001 (mean=-0.3140 percent, *t*-statistic=-1.87) and 2002 (mean=-0.4633 percent , *t*-statistic=-3.14). Table 3 also indicates that risk is not sufficient to explain low returns of Thursday.

[11] Sunday is the first trading day for pre-1999 period.

[12] Data record of SEBO/N does not provide NEPSE index for Friday preceding August 31, 1999, although odd lot trading occurs for that date. We therefore treat that day as non-trading day for the corresponding period. Hence the result for this day for full sample period and post 1999 period is identical.

TABLE 3. Summary Statistics for the Day-of-the-Week Effect in the Nepalese Stock Market

Period	Sun	Mon	Tue	Wed	Thu	Fri	All Days
1995							
Mean	-0.1003%	0.0020%	-0.0535%	0.1099%	0.0879%		0.0093%
t-statistic	(-0.93)	(0.02)	(-0.59)	(1.01)	(0.55)		(0.18)
Standard Deviation	0.7091%	0.7590%	0.5949%	0.7315%	0.9777%		0.7554%
Percentage Positive	41.86%	42.86%	51.16%	46.67%	57.89%		47.87%
Number of Observations	43	42	43	45	38		211
1996							
Mean	0.0931%	-0.1680%	-0.0132%	-0.0915%	-0.1095%		-0.0569%
t-statistic	(1.44)	(-2.76**)	(-0.21)	(-1.83*)	(-1.54)		(-2.03**)
Standard Deviation	0.4541%	0.4256%	0.4300%	0.3505%	0.4716%		0.4335%
Percentage Positive	51.02%	32.65%	50.00%	42.86%	38.64%		43.10%
Number of Observations	49	49	48	49	44		239
1997							
Mean	0.0869%	-0.0610%	-0.1110%	0.0918%	-0.0757%		-0.0143%
t-statistic	(1.19)	(-0.77)	(-0.94)	(1.39)	(-0.75)		(-0.35)
Standard Deviation	0.5007%	0.5291%	0.8178%	0.4470%	0.6953%		0.6167%
Percentage Positive	55.32%	35.56%	37.50%	58.70%	51.06%		47.64%
Number of Observations	47	45	48	46	47		233
1998							
Mean	0.1070%	-0.1206%	0.0896%	0.0035%	0.0880%		0.0333%
t-statistic	(0.85)	(-0.82)	(1.45)	(0.02)	(1.21)		(0.59)
Standard Deviation	0.8528%	1.0021%	0.4251%	1.2311%	0.4927%		0.8581%
Percentage Positive	69.57%	56.52%	61.70%	65.31%	60.87%		62.82%
Number of Observations	46	46	47	49	46		234
1999							
Mean	0.2602%	0.1871%	0.1084%	0.2022%	0.0823%	0.3348%	0.1720%
t-statistic	(2.18**)	(2.40**)	(1.24)	(2.07**)	(0.92)	(4.33**)	(4.39**)
Standard Deviation	0.6659%	0.5351%	0.5980%	0.6696%	0.6229%	0.2998%	0.6003%
Percentage Positive	70.97%	70.21%	63.83%	68.09%	66.67%	80.00%	68.51%
Number of Observations	31	47	47	47	48	15	235
2000							
Mean		0.2948%	0.1878%	0.1180%	0.4108%	0.3003%	0.2627%
t-statistic		(2.17)	(1.10)	(0.70)	(4.11**)	(2.32**)	(4.11**)
Standard Deviation		0.9711%	1.1612%	1.1469%	0.6703%	0.8949%	0.9823%
Percentage Positive		56.86%	63.04%	54.35%	77.78%	64.58%	58.90%
Number of Observations		51	46	46	45	48	236
2001							
Mean		-0.1676%	-0.2609%	-0.4998%	-0.3140%	-0.0086%	-0.2512%
t-statistic		(-1.02)	(-1.84*)	(-2.53**)	(-1.87*)	(-0.06)	(-3.38**)
Standard Deviation		0.3128%	0.0715%	0.0148%	0.0682%	0.9554%	1.1405%
Percentage Positive		43.48%	40.00%	41.67%	35.56%	51.06%	42.37%
Number of Observations		46	50	48	45	47	236

TABLE 3 (continued)

Period	Sun	Mon	Tue	Wed	Thu	Fri	All Days
2002							
Mean		-0.0904%	0.2387%	-0.1093%	-0.4633%	-0.1463%	-0.1163%
t-statistic		(-0.78)	(1.46)	(-0.69)	(-3.14**)	-0.91	(-1.72*)
Standard Deviation		0.8153%	1.1057%	1.1117%	1.0232%	1.0677%	1.0431%
Percentage Positive		34.00%	50.00%	53.06%	31.25%	38.64%	41.35%
Number of Observations		50	46	49	48	44	237
2003							
Mean		0.0821%	0.0696%	-0.0646%	-0.1113%	-0.0048%	-0.0065%
t-statistic		(0.69)	(0.57)	(-1.14)	(-1.40)	(-0.05)	(-0.15)
Standard deviation		0.8120%	0.8678%	0.4023%	0.5557%	0.6395%	0.6744%
Percentage Positive		46.81%	36.00%	38.00%	46.94%	42.86%	40.00%
Number of Observations		47	50	50	49	49	245
2004							
Mean		0.1560%	0.0430%	0.0467%	-0.0020%	0.1153%	0.0703%
t-statistic		(2.06**)	(0.63)	(0.50)	(-0.02)	(1.79*)	(1.80)
Standard deviation		0.0453%	0.5322%	0.6197%	0.9866%	0.0797%	0.6021%
Percentage Positive		63.04%	68.75%	57.14%	61.22%	58.70%	41.18%
Number of Observations		46	48	49	49	46	238
Pre-1999							
Mean	0.0802%	-0.0374%	-0.0105%	0.0489%	0.0091%		0.0183%
t-statistic	(1.81*)	(-0.79)	(-0.26)	(0.94)	(0.19)		(0.88)
Standard deviation	0.6507%	0.6933%	0.6012%	0.7727%	0.6775%		0.6817%
Percentage Positive	56.94%	46.73%	51.83%	55.45%	54.59%		53.12%
Number of Observations	216	214	218	220	207		1075
Post-1999							
Mean		0.0557%	0.0606%	-0.0824%	-0.0887%	0.0709%	0.0029%
t-statistic		(1.03)	(1.03)	(-1.34)	(-1.59)	(1.34)	(0.11)
Standard deviation		0.8619%	0.9354%	0.9875%	0.8877%	0.8352%	0.9052%
Percentage Positive		49.41%	51.37%	50.78%	50.79%	53.41%	51.14%
Number of Observations		255	255	258	252	249	1269
1995-2004							
Mean	0.0802%	0.0132%	0.0278%	-0.0220%	-0.0446%	0.0709%	0.0100%
t-statistic	(1.81*)	(0.36)	(0.76)	(-0.54)	(-1.19)	(1.34)	(0.60)
Standard deviation	0.6507%	0.7900%	0.7989%	0.8965%	0.8004%	0.8352%	0.8103%
Percentage Positive	56.94%	48.19%	51.59%	52.93%	52.51%	53.41%	52.05%
Number of Observations	216	469	473	478	459	249	2344

Notes: (a) The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995-2004 (*t*-statistics are in parenthesis).

(b) Data record of SEBO/N does not provide NEPSE index for Friday preceding August 31, 1999, although odd lot trading occurs for that date. We therefore treat that day as non-trading day for corresponding period.

* Significant at the 0.10 level for two-tailed test.

** Significant at the 0.05 level for a two tailed test.

To make a test of the effect, the following regression equation with dummies is carried out (French[13], 1980; Brus, Liu & Schulman, 2003; Galai & Levy, 2002).

[13] We add extra dummy variable d_{6t} to regression equation of that used in this study to take into account all trading days before and after elimination of Sunday trading sessions.

$$R_t=\beta_0+ \beta_1 d_{2t}+ \beta_2 d_{3t}+ \beta_3 d_{4t}+ \beta_4 d_{5t} + \beta_5 d_{6t}+ \varepsilon_t$$

where, R_t is the mean return of the stock index on day t.

The variable d_{it} takes a value of one if the return occurs on the *i* day and 0 if the return occurs on day other than *i* day (d_{2t} =Monday, d_{3t} =Tuesday, d_{4t} =Wednesday, d_{5t} =Thursday; for post 1999, d_{2t} =Tuesday, d_{3t} =Wednesday, d_{4t} =Thursday, d_{5t} =Friday; for the entire period and year 1999, d_{2t} =Monday, d_{3t} =Tuesday, d_{4t}= Wednesday, d_{5t} =Thursday, d_{6t} =Friday). The coefficient β_0 measures the mean return for Sunday (for post-1999, mean return for Monday) and the coefficients β_1 through β_4 measure the difference between the mean return for each of the other days of the week and the mean return for Sunday (for post-1999, mean return for Monday). For entire period and year 1999, the coefficient β_0 measures the mean return for Sunday and the coefficients β_1 through β_5 measure the difference between the mean return for each of the other days of the week and the mean return for Sunday. ε_t is the error term.

TABLE 4. Regression Coefficients for Day-of-the-Week Effect in the Nepalese Stock Market

Period	β_0	β_1	β_2	β_3	β_4	β_5	Adj. R^2	F
1995	-0.1003%	0.1023%	0.0469%	0.2102%	0.1882%			
	(-0.87)	(0.62)	(0.29)	(1.30)	(1.11)		-0.77%	0.60
1996	0.0931%	-0.2611%	-0.1063%	-0.1846%	-0.2026%			
	(1.52)	(-3.02**)	(-1.23)	(-2.14**)	(-2.28**)		2.79%	2.71**
1997	0.0869%	-0.1479%	-0.1979%	0.0049%	-0.1626%			
	(0.97)	(-1.15)	(-1.57)	(0.04)	(-1.28)		0.23%	1.14
1998	0.1070%	-0.2276%	-0.0173%	-0.1034%	-0.0190%			
	(0.84)	(-1.27)	(-0.10)	(-0.58)	(-0.11)		-0.76%	0.56
1999	0.2667%	-0.0851%	-0.1610%	-0.0645%	-0.2026%	0.0681%		
	(2.70**)	(-0.64)	(-1.21)	(-0.49)	(-1.51)	(0.37)	-0.38%	0.82
2000		0.2948%	-0.1070%	-0.1768%	0.1160%	0.0055%		
		(2.14**)	(-0.53)	(-0.88)	(0.58)	(0.03)	-0.69%	0.60
2001		-0.1676%	-0.0934%	-0.3322%	-0.1465%	0.1729%		
		(-1.00)	(-0.40)	(-1.41)	(-0.61)	(0.73)	0.42%	1.25
2002		-0.0904%	0.3291%	-0.0189%	-0.3729%	-0.0559%		
		(-0.62)	(1.57)	(-0.09)	(-1.80*)	(-0.26)	2.89%	2.76**
2003		0.0821%	-0.0125%	-0.1467%	-0.1934%	-0.0869%		
		(0.83)	(-0.09)	(-1.07)	(-1.40)	(-0.63)	-0.42%	0.75
2004		0.1560%	-0.1130%	-0.1093%	-0.1580%	-0.0407%	-0.83%	0.51
		(1.75*)	(-0.91)	(-0.88)	(-1.27)	(-0.32)		
Pre-1999	0.0802%	-0.1176%	-0.0907%	-0.0313%	-0.0711%		0.01%	1.02
	(1.73*)	(-1.79*)	(-1.39)	(-0.48)	(-1.07)			
Post-1999		0.0557%	0.0049%	-0.1381%	-0.1444%	0.0152%	0.33%	2.05*
		(0.98)	(0.06)	(-1.73)	(-1.80*)	(0.19)		
1995-2004	0.0802%	-0.0670%	-0.0524%	-0.1022%	-0.1248%	-0.0092%	0.05%	1.22
	(1.45)	(-1.01)	(-0.79)	(-1.54)	(-1.87*)	(-0.12)		

Notes: The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995-2004 (*t*- statistics are in parenthesis).

* Significant at the 0.10 level for two-tailed test

** Significant at the 0.05 level for a two tailed test.

The regression model is tested for the null hypothesis H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ against the alternative hypothesis that all returns for the weekdays are not equal. The significance of coefficient of at least one dummy variable confirms that there is existence of the day- of-the-week effect. This approach is equivalent to regressing the returns on six daily dummies, with no constant term, and testing for the equality of all parameters.

Table 4 reports the regression results for the day-of-the-week effect .The results do not support the null hypothesis. The coefficient of dummy variable d_{5t} (β_4) representing the difference between Thursday and Sunday returns, are significantly negative for the entire period at 10 percent level of significance. Interestingly, the magnitude of this coefficient is also highest .This pattern also remain consistent for the post 1999 period (but the coefficient now represents the difference between Thursday and Monday mean return). However for pre-1999, it is the coefficient of dummy variable d_{3t} (β_0) that possess this attribute. If individual years are considered we find no consistent pattern. In addition we find disappearing pattern of significant coefficients representing the differences between each day of the week and the benchmark day.

To summarize, our results indicate the day-of- the-week effect for full sample period, sub- periods and for some individual years. However, the pattern is different from the one observed in most other developed markets. Instead of negative returns on Mondays or even Tuesdays, we have negative returns on Thursdays[14] (significant), for full sample period and post-1999 sub period while for pre-1999 we observe negative return for Monday, as similar to international market (when Sunday is the first trading day) but again the significant positive return observed for Sunday is inconsistent to that observed for other markets.

Holiday Effect

Table 5 provides the descriptive statistics for stock returns on pre-holidays, post-holidays and regular days as defined by Lakonishok and Smidt (1988).The average return for pre-holiday and regular day are insignificantly positive for the entire period (mean=0.0202 percent ,t statistics =0.29 and mean=0.0080 percent, t statistics =0.45 respectively).In contrast to this ,average post-holidays return is insignificant -0.0400 percent (t statistics=-0.51).Not surprisingly, the pre-holiday rate of return is greater than both regular day rate of return and post-holiday rate of return. This is consistent to that of Lakonishok and Smidt obtained for U.S. markets. But the magnitude is much lower than that observed for the U.S. market .For instance Lakonishok and Smidt (1988) observed that the pre- holiday rate of return is 23 times greater than the regular daily rate of return for the total sample

[14] Katerina, Demetres, Komisopoulos (2002) also observe negative returns on Thursdays, last trading day of the week (but insignificant) for the Athens Stock market.

period of ninety years. However we observe the magnitude to be three times[15] for total sample period of ten years. The results for the sub periods are in general consistent with that for total period results. In addition holiday accounts for 53 percent rate of the increase in NEPSE index[16].Table 5 also reports that for year 2000 only rates of return around holidays (i.e., pre-holidays, post-holidays and regular days) are significant at conventional level of significance. This result does not remain stationary across other years. One can also find from Table 5 that a pre-holiday return is not a reward for bearing extra risk consistent to that obtained by Ariel (1990) .For example for full sample period standard deviation is greater for post holiday rate of return than that for pre-holiday rate of return.

TABLE 5. Summary Statistics for the Holiday Effect in the Nepalese Stock Market

Period	Pre-holiday	Post-holiday	Regular day
1995			
Mean	-0.0182%	0.1242%	-0.0260%
t-statistic	(-0.10)	(0.92)	(-0.41)
Standard Deviation	0.8205%	0.6016%	0. 8215%
Percentage Positive	45.00%	65.00%	46.20%
Number of Observations	20	20	171
1996			
Mean	-0.1498%	-0.0184%	-0.0536%
t-statistic	(-2.01*)	(-0.15)	(-1.76*)
Standard Deviation	0.2889%	0.4614%	0.4407%
Percentage Positive	26.67%	60.00%	42.58%
Number of Observations	15	15	209
1997			
Mean	-0.1072%	0.0827%	-0.0213%
t-statistic	(-0.81)	(0.40)	(-0.51)
Standard Deviation	0.5614%	0.9073%	0.5891%
Percentage Positive	55.56%	63.16%	44.90%
Number of Observations[a]	18	19	196
1998			
Mean	0.1703%	-0.4062%	0.0321%
t-statistic	(1.41)	(-0.83)	(0.64)
Standard Deviation	0.4821%	2.0118%	0.7075%
Percentage Positive	62.50%	58.82%	62.19%
Number of Observations	16	17	201
1999			
Mean	0.3164%	0.1383%	0.1613%
t-statistic	(3.96**)	(1.60)	(3.59**)
Standard Deviation	0.3388%	0.3675%	0.6344%
Percentage Positive	83.33%	66.67%	66.83%
Number of Observations	18	18	199

[15] Lauterbach and Uncar (1995) also obtain the similar results for the Israeli stock market.
[16] Lakonishok and Smidt (1988) find that holiday accounts for about 50 percent of the price increase in Dow Jones Industrial Average.

TABLE 5 (continued)

Period	Pre-holiday	Post-holiday	Regular day
2000			
Mean	0.8398%	0.7968%	0.2026%
t-statistic	(1.98*)	(2.45**)	(3.18**)
Standard Deviation	1.4720%	1.0795%	0.9300%
Percentage Positive	66.67%	81.82%	61.97%
Number of Observations	12	11	213
2001			
Mean	-0.0911%	-0.4236%	-0.2463%
t-statistic	(-0.26)	(-1.71)	(-3.12**)
Standard Deviation	1.3140%	0.9599%	1.1373%
Percentage Positive	71.43%	33.33%	41.06%
Number of Observations	14	15	207
2002			
Mean	-0.7824%	-0.4716%	-0.0330%
t-statistic	(-2.71**)	(-2.00*)	(-0.46)
Standard Deviation	1.1920%	0.9452%	1.0163%
Percentage Positive	29.41%	18.75%	44.12%
Number of Observations	17	16	204
2003			
Mean	0.2376%	0.1031%	-0.0262%
t-statistic	(2.38**)	(0.61)	(-0.56)
Standard Deviation	0.3464%	0.6076%	0.6900%
Percentage Positive	75.00%	46.15%	39.55%
Number of Observations	12	13	220
2004			
Mean	0.0621%	-0.1231%	0.0859%
t-statistic	(0.77)	(-0.82)	(2.00**)
Standard deviation	0.3133%	0.6013%	0.6171%
Percentage Positive	40%	37.5%	65.22%
Number of Observations	15	16	207
Pre-1999			
Mean	0.0192%	-0.0177%	0.0093%
t-statistic	(0.03)	(-0.36)	(0.53)
Standard Deviation	0.5704%	1.0706%	0.6576%
Percentage Positive	52.44%	60.71%	51.93%
Number of Observations	82	84	909
Post-1999			
Mean	0.0212%	-0.0647%	0.0069%
t-statistic	(0.16)	(-0.62)	(0.26)
Standard deviation	1.1185%	0.9039%	0.8883%
Percentage Positive	57.33%	44.74%	51.07%
Number of Observations	75	76	1118

TABLE 5 (continued)

Period	Pre-holiday	Post-holiday	Regular day
1995-2004			
Mean	0.0202%	-0.0400%	0.0080%
t-statistic	(0.2893)	(-0.5101)	(0.4533)
Standard deviation	0.8732%	0.9921%	0.7930%
Percentage Positive	54.78%	53.13%	51.46%
Number of Observations	157	160	2027

Note: The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995-2004 (*t*-statistics are in parenthesis).A holiday is a day when trading would normally have occurred but did not. For the pre-1999 period, these exclude Friday and Saturday and for post 1999 these exclude Saturday and Sunday. The days on which stock market strikes occur are also counted as holidays. Further, days are classified as pre-holidays, post-holidays and regular days (neither) without regard to the day of the week Pre-holidays are those days which have at least one preceding day as trading day, but at least one succeeding day as holiday. Post-holidays are for those days which have at least one preceding day as holiday, but at least one succeeding day as trading day as defined by Lakonishok & Smidt (1988).

a The number of observations for the pre-holidays and number of post-holidays must equal the number of holidays. In our case, the number of pre-holidays are not equal to the number of the post-holidays (except for 1995 and 1996).This is because, for some observations, the same day appears as pre-holidays as well as post-holidays.

* Significant at the 0.10 level for two-tailed test.

** Significant at the 0.05 level for a two tailed test.

To make a further test of holiday effect the following regression equation with dummies is carried out (Lakonishok & Smidt, 1988, Joshi, 2004, Meneu & Pardo, 2003.).

$$R_t=\beta_0+ \beta_1 d_{2t}+ \beta_2 d_{3t}+ \varepsilon_t$$

where R_t is the mean return of the stock index on day t and the dummy variable d_{it} indicates the day on which the return is observed (d_{2t} = post-holidays and d_{3t} = regular days), and d_{2t} attains a value of 1 if the return is observed on post-holidays, 0 otherwise. Similar remarks apply to d_{3t}. From basic econometrics we know that the coefficient β_0 measures the mean return for pre-holiday and the coefficients β_1 and β_2 measure the difference between the mean returns for post-holiday and pre-holiday and regular day and pre-holiday. ε_t is the error term. The regression model is tested for the null hypothesis H_0: $\beta_1= \beta_2= 0$ against the alternative hypothesis that average returns around holidays are not equal. The significant positive coefficient of at least one dummy variable confirms that there is existence of the holiday effect. This approach is equivalent to regressing the returns on three daily dummies, with no constant term, and testing for the equality of all parameter.

TABLE 6. Regression Coefficients for the Holiday Effect in the Nepalese Stock Market

Period	β_0	β_1	β_2	Adjusted R^2	F statistic
1995	-0.0182% (-0.10)	0.1424% (0.56)	-0.0078% (-0.04)	-0.66%	0.31
1996	-0.1498% (-1.34)	0.1314% (0.83)	0.0962% (0.83)	-0.50%	0.41
1997	-0.1072% (-0.74)	0.1899% (0.93)	0.0859% (0.56)	-0.48%	0.44
1998	0.1702% (0.80)	-0.5765% (-1.94**)	-0.1381% (-0.62)	1.16%	2.37
1999	0.3164% (2.23)	-0.1781% (-0.89)	-0.1551% (-1.05)	-0.36%	0.58
2000	0.8398% (3.00**)	-0.0429% (-0.11)	-0.6372% (-2.22**)	2.66%	4.21**
2001	-0.0911% (-0.30)	-0.3325% -(0.79)	-0.1552% (-0.49)	-0.59%	0.31
2002	-0.7824% (-3.15**)	0.3108% (0.87)	0.7494% (2.90**)	3.46%	5.23**
2003	0.2376% (1.22)	-0.1345% (-0.50)	-0.2638% (-1.32)	0.04%	1.05
2004	0.0621% (0.40)	-0.1853% (-0.86)	0.0237% (0.15)	-0.09%	0.90
Pre-1999	0.0192% (0.25)	-0.0369% (-0.34)	-0.0099% (-0.12)	-0.17%	0.07
Post-1999	0.0212% (0.20)	-0.0859% (-0.58)	-0.0143% (-0.13)	-0.12%	0.24
1995-2004	0.0205% (0.38)	-0.0684% (-0.90)	-0.0125% (-0.22)	-0.04%	0.54

Note: The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995-2004 (*t*-statistics are in parenthesis)

* Significant at the 0.10 level for two-tailed test

** Significant at the 0.05 level for a two tailed test.

Table 6 reports the regression results for the holiday effect. The results support our null hypothesis for equality between the pre-holiday mean return, post-holiday mean return and the regular day mean return. The coefficients of dummy variables d_{2t} and d_{3t} are not significant at usual level of significance for the entire period. These results also holds for both of the sub periods and the majority of the individual years .The exception to this is 1998 where the coefficient of d_{2t} representing the difference between post-holiday and pre-holiday rate of return is significantly negative at 5 percent level of significance and 2000 and 2002 for which the coefficient is significantly (negative for 2000 and positive for 2002)

different from zero. In other words, we observe holiday effect for 1998 and 2000 but inverted holiday effect for 2002.

To summarize, our results indicate that pre-holiday rate of return is in general greater than post-holiday and regular day return (represented by coefficients β_1 and β_2) but statistically insignificant and inconsistent with that obtained for other developed markets for most of the period. More specifically, we observe fading holiday effect, since it is not observed after 2002.

Half-Month Effect

Table 7 reports the descriptive statistics for the stock returns during the first-half-of-the-month and second-half-of-the-month period as defined by Lakonishok and Smidt (1988). The results indicate that the average first-half-of-the-month (FHM) return is insignificant 0.0208 percent (*t* statistics =0.90) whereas average second-half-of-the-month (SHM) return is insignificant at -0.0101 percent (*t* statistic= -0.41). Interestingly, the average daily return for the FHM is three times greater than the average daily return for the SHM. These results remain consistent regardless of the sub periods considered. When the entire period is spilt into years, we observe the mean FHM and SHM return to be positive and undistinguishable from zero in year 2000 and 2001. However for 1996 and 2002 (mean= -0.0728 percent, *t*-statistics = -2.10 and mean= -0.3653 percent, *t*-statistics = -3.35, respectively) we find only the average SHM return to be significantly different from zero. In addition Table 7 reports significant FHM return only for 2003 (mean= -0.1719 percent, *t*-statistics = -1.80). One can also see that higher return for FHM is not a reward for assuming risk.

TABLE 7. Summary Statistics for the Half-Month Effect in the Nepalese Stock Market

Period	First-Half-of-the-Month	Last-Half-of-the-Month
1995		
Mean	0.0412%	-0.0615%
t-statistic	(0.450)	(-1.04)
Standard Deviation	0.9565%	0.5952%
Percentage Positive	50.46%	45.10%
Number of Observations	109	102
1996		
Mean	(-0.0422)	(-0.0728)
t-statistic	(-0.97)	(-2.10**)
Standard Deviation	0.4852%	0.3711%
Percentage Positive	40.32%	46.09%
Number of Observations	124	115

TABLE 7 (continued)

Period	First-Half-of-the-Month	Last-Half-of-the-Month
1997		
Mean	-0.0130%	-0.0262%
t-statistic	(-0.20)	(-0.55)
Standard Deviation	0.7073%	0.5100
Percentage Positive	50.00%	44.35%
Number of Observations	118	115
1998		
Mean	0.0710%	-0.0507%
t-statistic	(1.35)	(-0.51)
Standard Deviation	0.5736%	1.0765%
Percentage Positive	(63.03)	(61.74)
Number of Observations	119	115
1999		
Mean	0.1212	0.2239
t-statistic	(2.60**)	(3.53**)
Standard Deviation	(0.5108)	(0.6799)
Percentage Positive	65%	71.30%
Number of Observations	120	115
2000		
Mean	0.2746%	0.2512%
t-statistic	(3.68**)	(2.43**)
Standard Deviation	0.8026%	1.1326%
Percentage Positive	63.79	62.50%
Number of Observations	116	120
2001		
Mean	-0.1390%	-0.3653%
t-statistic	(-1.38)	(-3.35**)
Standard Deviation	1.0959%	1.1779%
Percentage Positive	42.86%	41.88%
Number of Observations	119	117
2002		
Mean	-0.1719%	-0.0564%
t-statistic	(-1.80*)	(-0.59)
Standard Deviation	1.0613%	1.0244%
Percentage Positive	33.33%	50.00%
Number of Observations	123	114
2003		
Mean	0.0134%	-0.0262%
t-statistic	(0.17)	(-0.68)
Standard Deviation	0.8544%	0.4299%
Percentage Positive	40.98%	43.09%
Number of Observations	122	123

TABLE 7 (continued)

Period	First-Half-of-the-Month	Last-Half-of-the-Month
2004		
Mean	0.0677%	0.0731%
t-statistic	(1.32)	(1.23)
Standard Deviation	0.5689%	0.6381%
Percentage Positive	58.54%	65.22%
Number of Observations	123	115
Pre-1999		
Mean	0.0332%	-0.0165%
t-statistic	(1.16)	(-0.53)
Standard Deviation	0.6722%	0.7123%
Percentage Positive	54.18%	51.43%
Number of Observations	550	525
Post-1999		
Mean	0.0103%	-0.0047%
t-statistic	(0.29)	(-0.13)
Standard deviation	0.8882%	0.9230%
Percentage Positive	48.37%	53.99%
Number of Observations	643	626
1995-2004		
Mean	0.0208%	-0.0101%
t-statistic	(0.90)	(-0.41)
Standard Deviation	0.7957%	0.8332%
Percentage Positive	51.05%	52.82%
Number of Observations	1193	1151

Note: The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995-2004 (*t*-statistics are in parenthesis).The first-half-of-the-month is the first through the fifteenth calendar day of the month, if it is a trading day, or if not, through the next trading day. The last-half-of-the- month consists of the remaining days as defined by Lakonishok and Smidt (1988).

* Significant at the 0.10 level for two-tailed test.

** Significant at the 0.05 level for a two tailed test.

To make a further test of the half month effect, the following regression equation is run (Balaban & Bulu, 1996).

$$R_t=\beta_0+ \beta_1 d_{2t}+ \varepsilon_t$$

where the dependent variable (R_t) is the daily return on NEPSE index. The independent variable (d_{2t}) is dichotomous variable. The variable d_{2t} takes a value of one if the return occurs on the second-half-of-the-month days and 0 if the return occurs on first-half of the month as defined by Lakonishok and Smidt. The intercept β_0 measures the mean return of the FHM period and the coefficients β_1 measures the difference between the mean SHM return and the mean FHM return.

ε_t is the error term. The regression model is tested for the null hypothesis H_0: $\beta_1 = 0$ against the alternative hypothesis that there is no equality of mean FHM return and mean SHM return .The significant negative coefficient β_1 confirms that there is existence of the half month effect. This approach is equivalent to regressing the returns on two daily dummies, with no constant term, and testing for the equality of all parameters.

TABLE 8. Regression Coefficients for the Half-Month Effect in the Nepalese Stock Market

Period	β_0	β_1	Adjusted R^2	F statistic
1995	0.0412%	-0.1026%		
	(0.54)	(-0.93)	-0.07%	0.86
1996	-0.0422%	-0.0306%		
	(-1.08)	(-0.55)	-0.30%	0.30
1997	-0.0130%	-0.0132%		
	(-0.23)	(-0.16)	-0.42%	0.03
1998	0.0710%	-0.1217%		
	(0.90)	(-1.08)	0.08%	1.18
1999	0.1212%	0.1026%		
	(2.21**)	(1.31)	0.31%	1.72
2000	0.2746%	-0.0233%		
	(3.00**)	(-0.18)	-0.41%	0.03
2001	-0.1390%	-0.2263%		
	(-1.33)	(-1.53)	0.56%	2.34
2002	-0.1719%	0.1155%		
	(-1.83*)	(0.85)	-0.12%	0.72
2003	0.0134%	-0.0396%		
	(0.22)	(-0.46)	-0.32%	0.21
2004	0.0677%	0.0054%		
	(1.24)	(0.07)	-0.42%	0.00
Pre-1999	0.0332%	-0.0497%		
	(1.12)	(-1.18)	0.04%	1.39
Post-1999	0.0103%	-0.0149%		
	(0.29)	(-0.29)	-0.07%	0.09
1995-2004	0.0208%	-0.0309%		
	(0.88)	(-0.92)	-0.01%	0.84

Note: The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995-2004 (*t*-statistics are in parenthesis).

* Significant at the 0.10 level for two-tailed test.

** Significant at the 0.05 level for a two tailed test.

The regression results for each year as well as the sub period and whole period are given in Table 8. For the period 1995 to 2004, the null of equality of mean daily returns across halves of calendar months are rejected at the usual level of significance. The coefficient β_1 representing the difference between the mean return of the first and second half of calendar months are negative and insignificant at usual level of significance. Lakonishok and Smidt obtain average difference

between FHM and SHM return to be 0.237 percent.[17] However our findings show only small magnitude of 0.0309 percent for this. This result for total sample also holds for sub-periods and most of the individual years. The exception is year 1999 and 2002 where the coefficient β_1 is insignificantly positive. Interestingly, β_0 representing mean daily return for the FHM is undistinguishable from zero for these years only (exception is 2000).

To summarize, our results show no half-month effect irrespective of the period considered. In other words, there is no statistical difference between stock returns of the FHM and SHM. The result is consistent to that observed in the international markets: Lakonishok and Smidt (1988) for US market; Wong (1995) for stock markets of Singapore, Malaysia, Hong Kong, Taiwan and Thailand; Balaban & Bulu (1996) for Istanbul Securities Exchange and Lauterbach and Uncar (1995) for Israeli Stock Market.

Turn-of-the-Month (TOM) Effect

Table 9 reports the descriptive statistics for the four day turn–of–the–month (TOM) period (as defined by Lakonishok and Smidt (1988) and rest-of- the-month period (ROM).The results indicate that the average TOM and ROM returns are insignificant -0.0054 percent (*t*-statistics = -0.14) and 0.0085 percent (*t* statistic= 0.45).This results hold for only the pre-99 sub period . For the post-99 sub period, the direction of mean TOM and ROM return changes, but remains insignificant at the conventional level of significance. In addition, Table 9 shows that for year 1999 (mean=0.2083 percent, *t*-statistic=5.09), 2000 (mean=0.2935 percent, *t*-statistic=3.83) and 2004 (mean=0.0747 percent, *t*-statistic=1.75) the average ROM period return is positive and significantly different from zero. However, the average return is negative and significant for 2001 (mean=-0.2085 percent, *t*-statistic=-0.2805) and 2003 (mean=-0.0629 percent, *t*-statistic= -0.0629) at usual level of significance.

If the whole period is spilt into years, then we find no significant mean TOM return .The exception is the year 1995, for which the return is significant -0.1620 percent .(t-statistic=-1.65).

[17] Based on a *t* –test (5 percent significance level), they could not reject the null hypothesis that the two halves of the month have the same rate of return for any of the 10 periods.

TABLE 9. Summary Statistics for the Turn-of-the-Month Effect in the Nepalese Stock Market

Period	Turn-of-the-Month	Rest-of-the-Month
1995		
Mean	-0.1620%	0.0245%
t-statistic	(-1.89)	(0.37)
Standard Deviation	0.5552%	0.8495%
Percentage Positive	38.10%	50.00%
Number of Observations	42	168
1996		
Mean	-0.0940%	-0.0442%
t-statistic	(-1.31)	(-1.45)
Standard Deviation	0.4977%	0.4219%
Percentage Positive	31.25%	46.07%
Number of Observations	48	191
1997		
Mean	-0.0029%	-0.0232%
t-statistic	(-0.02)	(-0.59)
Standard Deviation	0.8702%	0.5349%
Percentage Positive	45.83%	47.57%
Number of Observations	48	185
1998		
Mean	0.0425%	0.0023%
t-statistic	(0.67)	(0.03)
Standard Deviation	0.4363%	0.9379%
Percentage Positive	56.25%	63.98%
Number of Observations	48	186
1999		
Mean	0.0280%	0.2083%
t-statistic	(0.27)	(5.09**)
Standard Deviation	0.7284%	0.5593%
Percentage Positive	62.50%	69.52%
Number of Observations	48	187
2000		
Mean	0.1519%	0.2935%
t-statistic	(1.63)	(3.83**)
Standard Deviation	0.6457%	1.0500%
Percentage Positive	60.42%	64.36%
Number of Observations	48	188
2001		
Mean	-0.1276%	-0.2805%
t-statistic	(-0.67)	(-3.52**)
Standard Deviation	1.3168%	1.0924%
Percentage Positive	54.17%%	39.36%
Number of Observations	48	188

TABLE 9 (continued)

Period	Turn-of-the-Month	Rest-of-the-Month
2002		
Mean	-0.1905%	-0.1014%
t-statistic	(-1.33)	(-1.32)
Standard Deviation	0.9923%	1.0579%
Percentage Positive	33.33%	42.86%
Number of Observations	48	189
2003		
Mean	0.2240%	-0.0629%
t-statistic	(1.35)	(-1.82*)
Standard Deviation	1.1471%	0.4841%
Percentage Positive	47.92%	40.61%
Number of Observations	48	197
2004		
Mean	0.0568%	0.0747%
t-statistic	(0.60)	(1.75*)
Standard Deviation	0.6566%	0.5893%
Percentage Positive	58.33%	63.16%
Number of Observations	48	190
Pre-1999		
Mean	-0.0485%	0.0234%
t-statistic	(-1.11)	(0.97)
Standard Deviation	0.6465%	0.7033%
Percentage Positive	45.41%	54.67%
Number of Observations	218	856
Post-1999		
Mean	0.0313%	-0.0041%
t-statistic	(0.52)	(-0.15)
Standard Deviation	0.9694%	0.8887%
Percentage Positive	51.95%	51.04%
Number of Observations	256	1013
1995-2004		
Mean	-0.0054%	0.0085%
t-statistic	(-0.14)	(0.45)
Standard Deviation	0.8366%	0.8090%
Percentage Positive	48.95%	52.70%
Number of Observations	474	1869

Note: The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995-2004 (*t*-statistics are in parenthesis). Turn-of-the-month days include the last trading day of the previous month and the first three trading days of the month and rest-of-the-month days consists of the remaining days of the month as defined by Lakonishok and Smidt (1988).

* Significant at the 0.10 level for two-tailed test.

** Significant at the 0.05 level for a two tailed test.

To make a further test of the TOM effect, the following regression equation is run in line with Lakonishok and Smidt (1988) and (Compton, 2002).

$$R_t = \beta_0 + \beta_1 d_{2t} + \varepsilon_t$$

where the dependent variable (R_t) is the daily return on NEPSE index. The independent variable (d_{2t}) is a dichotomous variable. The variable d_{2t} takes a value of one if the return occurs on the TOM days and 0 if the return occurs on ROM days as defined by Lakonishok and Smidt (1988). The intercept β_0 measures the mean return of the ROM period and the coefficients β_1 measures the difference between the mean TOM return and the mean ROM return. ε_t is the error term. The regression model is tested for the null hypothesis H_0: $\beta_1 = 0$ against the alternative hypothesis that there is no equality of mean TOM return and mean RHM return. The significant positive coefficient β_1 confirms that there is an existence of the TOM effect. This approach is equivalent to regressing the returns on two daily dummies, with no constant term, and testing for the equality of all parameters.

TABLE 10. Regression Coefficients for the Turn-of-the Month Effect in the Nepalese Stock Market

Period	β_0	β_1	Adjusted R^2	F statistic
1995	0.0245% (0.40)	-0.1865% (-1.35)	0.39%	1.83
1996	-0.0442% (-1.39)	-0.0499% (-0.71)	-0.21%	0.50
1997	-0.0232% (-0.51)	0.0203% (0.20)	-0.41%	0.04
1998	0.0023% (0.04)	0.0402% (0.29)	-0.39%	0.08
1999	0.2083% (4.77**)	-0.1803% (-1.87*)	1.05%	3.48*
2000	0.2935% (4.10**)	-0.1416% (-0.89)	-0.09%	0.79
2001	-0.2805% (-3.37**)	0.1529% (0.83)	-0.13%	0.69
2002	-0.1014% (-1.33)	-0.0891% (-0.53)	-0.31%	0.28
2003	-0.0629% (-1.33)	0.2869% (2.68*)	2.46%	7.16**
2004	0.0747% (1.71**)	-0.0179% (-0.18)	-0.41%	0.03
Pre-1999	0.0234% (0.99)	-0.0719% (-1.37)	0.08%	1.87
Post-1999	-0.0041% (-0.15)	0.0354% (0.56)	-0.05%	0.31
1995-2004	0.0085% (0.45)	-0.0139% (-0.33)	-0.038%	0.11

Note: The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995-2004 (*t*-statistics are in parenthesis).

* Significant at the 0.10 level for two-tailed test.

** Significant at the 0.05 level for a two tailed test.

Table 10 reports the regression results for the full ten-year period, two sub-periods and individual years. The results show that, for total sample period the parametric test does not allow us to reject the null hypothesis of equality of mean return between the TOM period and ROM period. We also find that both the sub periods and most of the years exhibit consistent pattern. The exception is the year 1999 and 2003, for which we observe the significant coefficient, β_1, (negative for 1999 and positive for 2000) at 5 percent level of significance, representing the statistical difference between the stock returns of the TOM period and ROM period.

To summarize, our results indicate that there is no TOM effect for the period 1995-2004 and for the sub periods pre-1999 and post-1999. If individual years are investigated separately, the paper reports a significant TOM effect for 2003 but inverted TOM effect for 1999.The result is inconsistent to that of other international markets.

Time-of-the-Month Effect

Table 11 reports the summary statistics for the stock returns during the first-third-of-the-month, second -third-of-the-month and last -third-of-the-month. For the entire period, the mean rate of return around the first-third-of-the-month is insignificant at -0.0125 percent (*t*-statistic = 0.32). In contrast to this, the average return during second-third-of-the-month and last-third-of-the-month are positive and insignificant (mean=0.0092 percent, *t*- statistic=0.32 and mean=0.0214 percent, *t*-statistic=0.77 respectively) at conventional level of significance. Interestingly, the expected last -third-of-the-month return is more than two times larger than both the expected return for the second -third-of-the-month and first-third-of-the-month. The result, however, changes both in magnitude and direction for the two sub periods. If individual years are examined separately, we find significant positive return for second-third and last-third-of-the-month for 1999 (mean = 0.2114 percent, *t*-statistic = 4.03 and mean = 0.3163 percent and *t*-statistic = 4.85 respectively) and 2000 (mean = 0.3591 percent, *t*-statistic = 3.44 and mean = 0.3610 percent and *t*-statistic = 2.96 respectively) at five percent level of significance. However for year 2001, we observe negative and significant average return for second-third (mean = -0.3725 percent, *t*-statistic= -2.80) and last-third (mean= -0.3913 percent, *t*-statistic = -3.34) of-the-month. In addition we also find that there does not exist a risk return relationship around the first-third, second-third and last-third of the calendar month.

TABLE 11. Summary Statistics for the Time-of-the-Month Effect in the Nepalese Stock Market

Period	First-Third-of-the- Month	Second-Third-of-the- Month	Last-Third-of-the- Month
1995			
Mean	-0.0876%	0.1231%	-0.0741%
t-statistic	(-0.84)	(1.17)	(-0.98)
Standard Deviation	0.8649%	0.8792%	0.6342%
Percentage Positive	43.48%	54.29%	45.07%
Number of Observations	69	70	71
1996			
Mean	-0.0723%	-0.0422%	-0.0412%
t-statistic	(-1.52)	(-0.80)	(-0.88)
Standard Deviation	0.4318%	0.4757%	0.4042%
Percentage Positive	37.80%	48.15%	44.00%
Number of Observations	82	81	75
1997			
Mean	-0.0299%	0.0026%	-0.0344%
t-statistic	(-0.38)	(0.04)	(-0.59)
Standard Deviation	0.7138%	0.6173%	0.5125%
Percentage Positive	41.98%	56.16%	43.59%
Number of Observations	81	73	78
1998			
Mean	0.0723%	-0.0296%	0.0940%
t-statistic	(1.47)	(-0.28)	(1.50)
Standard Deviation	0.4341%	0.9398%	0.5499%
Percentage Positive	58.97%	63.29	66.23
Number of Observations	78	79	77
1999			
Mean	-0.0909%	0.2114%	0.3163%
t-statistic	(-0.75)	(4.03**)	(4.85**)
Standard Deviation	1.1195%	0.4569%	0.5608%
Percentage Positive	61.18%	67.11%	74.32%
Number of Observations	85	76	74
2000			
Mean	0.0923%	0.3591	0.3610
t-statistic	(0.93)	(3.44**)	(2.96**)
Standard Deviation	0.9103%	0.8786%	1.1053%
Percentage Positive	61.18%	66.20%	64.63%
Number of Observations	85	71	82
2001			
Mean	0.0176%	-0.3725%	-0.3913%
t-statistic	(0.13)	(-2.80**)	(-3.34**)
Standard Deviation	1.1855%	1.1578%	1.0484%
Percentage Positive	58.23%	26.32%	42.50%
Number of Observations	79	76	80
2002			
Mean	-0.1557%	-0.1872%	-0.0269%
t-statistic	(-1.30)	(-1.63)	(-0.23)
Standard Deviation	1.0550%	1.0165%	1.0590%
Percentage Positive	33.33%	39.74%	48.78%
Number of Observations	78	78	82

TABLE 11 (continued)

Period	First-Third-of-the- Month	Second-Third-of-the- Month	Last-Third-of-the- Month
2003			
Mean	0.0346%	-0.0314%	-0.0217%
t-statistic	(0.31)	(-0.60)	(-0.49)
Standard Deviation	0.9994%	0.4627%	0.3978%
Percentage Positive	37.80%	44.30%	43.90%
Number of Observations	82	79	82
2004			
Mean	0.0812%	0.0964%	0.0361%
t-statistic	(1.32)	(1.52)	(0.45)
Standard Deviation	0.5557%	0.5693%	0.6898%
Percentage Positive	59.26%	61.73%	65.33%
Number of Observations	81	81	75
Pre-1999			
Mean	-0.0520%	0.0417%	0.0386%
t-statistic	(-1.28)	(1.09)	(1.30)
Standard Deviation	0.7778%	0.7171%	0.5597%
Percentage Positive	47.96%	57.39%	53.11%
Number of Observations	367	352	354
1995-2004			
Mean	-0.0125%	0.0092%	0.0214%
t-statistic	(-0.41)	(0.32)	(0.77)
Standard Deviation	0.8683%	0.7998%	0.7725%
Percentage Positive	49.50%	52.62%	53.74%
Number of Observations	800	764	776

Note: The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995-2004 (*t*-statistics are in parenthesis).The first third of month is from the 28th day of the previous month to the 7th day of the month, the second third of month is from the 8th day to the 17th day of the month and the last third of the month is from the 18th day to the 27th day of the month as defined by Kohers and Patel (1999).

* Significant at the 0.10 level for two-tailed test.

** Significant at the 0.05 level for a two tailed test.

To make a further test of time-of-the-month effect the following regression equation with dummies is carried out in line with Kohers and Patel (1999), Lian (2002).

$$R_t = \beta_0 + \beta_1 d_{2t} + \beta_2 d_{3t} + \varepsilon_t$$

where R_t is the mean return of the stock index on day t and the dummy variable d_{it} indicates the day on which the return is observed (d_{2t} = first-third-month days and d_{3t}=second third month days). d_{2t} attains a value of 1 if the return is observed on the first-third-of-the-month days,0 otherwise. Similar remarks apply to d_{3t}. From basic econometrics we know that the coefficient β_0 measures the mean return for last third of the month and the coefficients β_1 and β_2 measure the difference between the mean returns for first -third-of-the-month and last -third-of-the-month and second-third-of-the-month and last -third-of-the-month .ε_t is the error term. The

regression model is tested for the null hypothesis H_0: $\beta_1 = \beta_2 = 0$ against the alternative hypothesis that average returns around time-of-the-month are not equal. The significant (positive) coefficient of at least one dummy variable confirms that there is existence of the time-of-the-month effect. This approach is equivalent to regressing the returns on three daily dummies, with no constant term, and testing for the equality of all parameters.

TABLE 12. Regression Coefficients for the Time-of-the-Month Effect in the Nepalese Stock Market

Period	β_0	β_1	β_2	Adjusted R^2	F statistic
1995	-0.0741%	-0.0135%	0.1972%	0.50%	1.52
	(-0.78)	(-0.10)	(1.46)		
1996	-0.0412%	-0.0312%	-0.0011%	-0.74%	0.13
	(-0.81)	(-0.44)	(-0.02)		
1997	-0.0344%	0.0045%	0.0370%	-0.80%	0.08
	(-0.49)	(0.05)	(0.37)		
1998	0.0940%	-0.0217%	-0.1236%	-0.22%	0.74
	(1.22)	(-0.20)	(-1.14)		
1999	0.3163%	-0.4072%	-0.1049%	3.95%	5.81**
	(3.45**)	(-3.25**)	(-0.82)		
2000	0.3610%	-0.2687%	-0.0019%	0.89%	2.07
	(3.36**)	(-1.78)	(-0.01)		
2001	-0.3913%	0.4089%	0.0188%	1.91%	3.28**
	(-3.09**)	(2.28)	(0.10)		
2002	-0.0269%	-0.1289%	-0.1603%	-0.40%	0.53
	(-0.23)	(-0.78)	(-0.97)		
2003	-0.0217%	0.0564%	-0.0097%	-0.64%	0.22
	(-0.29)	(0.53)	(-0.09)		
2004	0.0361%	0.0452%	0.0603%	-0.68%	0.21
	(0.52)	(0.47)	(0.62)		
Pre-1999	0.0386%	-0.0906%	0.0031%	0.21%	2.14
	(1.05)	(-1.76*)	(0.06)		
Post-1999	0.0070%	0.0140%	-0.0256%	-0.13%	0.21
	(0.16)	(0.23)	(-0.41)		
1995-2004	0.0214%	-0.0339%	-0.0122%	-0.06%	0.35
	(0.73)	(-0.83)	(-0.29)		

Note: The data for this table are from the Trading Report of Securities Board, Nepal (SEBO/N) for the period 1995 to 2004 (*t*-statistics are in parenthesis).

** 5% significance level.

* 10% significance level

The regression results of the third-month effect are presented in Table 12. The results support our null hypothesis. The coefficients β_0 representing the mean last - third-of-the-month returns are insignificantly different from zero for the entire

period and sub periods for which they are considered. The results are similar for coefficients β_1 and β_2 representing the difference between the first -third-of-the-month and last-third-of-the-month and second -third-of-the-month and last-third-of-the-month third, except for pre-1999 for which β_1 is significantly negative at five percent level of significance. Further, the overall regression is significant at the five percent level of significance (F statistic=5.81).

In addition, we also observe the significantly negative β_1 for 1999 and 2000 whereas significantly positive β_1 for 2001 at usual level of significance, when we spilt the total sample period into years. To summarize, our results indicate no time-of-the-month effect for the entire period and sub-period, post-1999. However, for pre-1999, we obtain reverse time-of-the-month effect[18] that is inconsistent to US market. The result of the sub-period also holds for 1999 and 2000. However, for 2001 we observe time-of-the-month effect consistent to the U.S. market (Kohers and Patel, 1999).

V. SUMMARY AND CONCLUSIONS

The study had used the Nepal Stock Exchange's return data to detect the presence of calendar anomalies for the period February 1, 1995 to December 31, 2004 using regression equation with seasonal dummies.

Our results show no evidence of month-of-the-year anomaly in stock returns. However, we find higher and positive (not significant) returns for October in contrast to that observed for January (significant) in international markets. We offer two possible explanations for this. The first explanation is based on the presence of *Dashain* and *Tihar* (Great festivals of Hindu) mostly occurring during October. Similar results were also obtained for Sri Lanka[19]. The second explanation is based on the information hypothesis, i.e., release of more information as a result of compulsion of disclosure norms[20].

In regard to the day-of-the-week anomaly we observe different pattern than the one observed in the other developed capital markets. However our result regarding negative returns on Thursday is consistent to that obtained for the Greek stock market. No specific explanation can be attributed for this.

In case of the holiday effect, it does not exist for entire sample period as well as for sub periods but is perceptible for some years when the entire period is spilt into years. Unfortunately, the results of study do not remain stationary. Even though, the results of this analysis are not entirely consistent with the evidence of other international markets the result obtained for the year 1998 and 2000 is consistent with those findings, suggesting that the holiday effect is a common

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[18] Lian (2002) obtain similar results that the mean daily return was not the highest in the first-third-of-the -month but rather, for Malaysia, US, Japan and Singapore, in the last- third- of-the- month.

[19] Empirical study on Sri Lanka observed insignificant positive return for April, the month during which *Sinhala* and *Tamil* new-year falls. See Joshi (2004).

[20] Shrestha (2004) finds positive correlation between the NEPSE index and corporate disclosure. Also, see K.C. & Joshi (2004).

phenomenon. However the result for 2002 shows inverted holiday effect, i.e., average post holiday return is greater than pre-holiday rate of return.

The results of the half-month effect analysis show the mean returns on the first-half of the month are higher than on the second half for most of the period considered. However, the difference is not statistically significant irrespective of the periods considered. In other words, the evidence shows no half-month anomaly that is consistent with the study on US market and emerging market.

In case of the TOM effect, the results show that the difference between the mean returns on TOM days and non-turn-of-the-month days is statistically insignificant for most of the periods. The exception is 1999 and 2003 for which we find inverted (negative) TOM effect and positive (traditional) TOM effect at the five percent level. The results are inconsistent with international evidence.

One should not be surprised with this result where various kinds of payments to investors are concentrated at the end of month in accordance to *Bikram Sambat*[21] rather than the Gregorian calendar in other countries.

With respect to the time-of-the-month effect, we obtain this effect for sub period pre- 1999 and for 1999 and 2000 that is inconsistent with the results in international market. However, for year 2001 we obtain results similar to U.S. market. To be specific, we observe a disappearing time-of-the-month effect.

The study thus concludes that NEPSE is not efficient in weak form if day-of-the-week anomaly is examined but weakly efficient in respect of other anomalies. In other words, investors can take advantage of information about the day-of–the-week when investing in the NEPSE[22]. However, this may be due to market imperfections and thus is not necessarily embarrassing for market efficiency. Therefore, further research should be undertaken not only to conform the results of the present study but also to examine the microstructure and operational procedure of the Nepalese Stock Exchange. In addition, it is necessary to investigate whether the reported anomalies are valid for individual shares or not[23].

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[21] The first day of calendar month according to this corresponds to 15th day of Gregorian month.

[22] Foreign investors can also benefit through international portfolio diversification in case of existence of calendar anomalies.

[23] The lack of these studies, *inter alia*, can be attributed to the unwillingness on the part of the Nepal Stock Exchange to disclose /supply its annual report.

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