

Seasonality in ETFs' Risk and Return: The November Effect

by

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Abstract

In this paper we demonstrate that a substantially positive November effect influences the risk and performance of all ETF market categories and classes of capitalization. Risk is the lowest in the month of November but December risk is even lower suggesting lower volatility in returns in the end of the year. A November effect is also found regarding the tracking error in all ETF categories and classes. Furthermore, investment strategies designed to exploit the November effect in ETFs' performance beats the buy and hold strategies on an average and accumulated level during a five-year period and investors can gain significant returns exposing themselves in modest volatility.

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1. Introduction

Exchange Traded Funds (hereafter ETFs) are hybrids of ordinary corporate stocks and open-ended mutual funds which invest in baskets of shares that closely replicate the performance and risk levels of specific broad, sector and international indexes. As such, ETFs track the performance of stock, bond, fixed income, commodity and real estate indexes and are subject to exchange trading rules offering flexibility to investors along with the ability to buy or sell the entire market with a single transaction at any time during the day.

The benefits and advantages of ETFs have been analyzed in an array of developed markets like the U.S., and Australia [Gastineau (2001), Carty (2001), Gallagher and Segara (2005)]. These studies find that their advantages like flexibility, risk diversification, tax efficiency and low costs have contributed to their successful proliferation. A number of other studies have focused on the ETF pricing and performance [Ackert and Tian (2000), Elton et al (2002), Poterba and Shoven (2002)] suggesting that ETF pricing does not differ significantly and longitudinally from their net asset value.

The seasonal patterns of ETFs performance and volatility is an area of study that has received little attention. Mazumder, Chu, Miller and Prather (2006) study the day-of-the-week effect in ETFs performance finding that ETFs exhibit negative return's seasonality on Mondays. Further, the authors find that there are divergences in the mean Monday and Friday returns and claim that the informed investors, who have access to low transactions costs, probably exploit the profitable opportunities of the day-of-the-week effects and may gain abnormal gains beating the buy and hold strategies.

The issue of monthly seasonality of ETFs has been studied by Rompotis (2007). He investigates the seasonal characteristics of ETFs return, risk, tracking error and volume during the period 2002-2006 and reveals the existence of a strong November effect in returns while the January effect in ETFs performance has not been found. Considering the volatility and tracking error of ETFs, Rompotis (2007) shows the existence of a semi-strong seasonal effect in the risk of ETFs in November and also shows that ETFs achieve their best indexes' replication in November. The combination of high average return and low risk and tracking error within November signals an opportunity for investors to gain sufficient returns during that month by exposing themselves in modest or low volatility and tracking failure. No seasonal effect in ETFs' trading activity was found but there is some direct relationship between risk and volume.

In this paper we expand the work of Rompotis (2007) in several ways. We firstly proceed in a brief analysis of the basic institutional characteristics of ETFs. This analysis provides answers for various questions regarding the diversification and risk characteristics of ETFs, the cost benefits, the trading convenience and the alternative trading strategies that can be implemented with ETFs, the tax efficiency and the arbitrage opportunities for institutional investors, the structure of ETFs and the types of investors choosing ETFs, and the liquidity's benefits of these alternative products.

Further, we investigate whether the November effect in ETFs return, risk and tracking error is a general ETF trait or is akin to certain market categories or classes of capitalization. Specifically, we split ETFs in broad, sector and international market groups to investigate whether the seasonal patterns in return, risk and tracking error are related to specific industries or market segments or if they are independent from the particular characteristics of each market sector and from the institutional and environmental conditions of local markets.

Our results indicate that the November effect in performance concerns all individual ETF categories or classes. We also find that ETFs in the broad, sector and international markets achieve approximately the same mean November return during the period 2002-2006. Yet, we note that the November's return of all ETF groups does not constantly exceed other monthly returns for all years of the study.

Moreover this paper reveals that the ETF risk and tracking error in November is relatively low and applies roughly for all the single ETF groups. Further, we spread ETFs in classes of large, median and small capitalization. This expansion is reasonable since various studies such as that of Lakonishok, Shleifer, Thaler and Vishny (1991) provided evidence that the seasonal patterns in returns are mostly due to small cap stocks. According to our findings, the November effect in ETFs' returns concerns, on the average, all classes of capitalization but small cap ETFs achieve slightly better performance than the large and medium ETFs.

At last we perform an ex-post comparison in return and volatility of various investment strategies by grouping ETFs' by market or by capitalization. Specifically, we compare the return and risk that could be obtained by investors had invested in broad (large cap), sector (medium cap) and international (small cap) ETFs only during November of each year as opposed to have followed two alternative buy and hold strategies. Both strategies refer to the purchase of a portfolio in the first day of each year held until the last trading day of the year. The first buy and hold strategy refers to an average market ETF portfolio and the second buy and hold strategy an ETF portfolio which receives four or five stars in the rating system by Morningstar; this portfolio does not consider the market segment or the capitalization of ETFs.

Considering the three market categories of ETFs, the results indicate that the strategies based on the seasonality of ETFs' performance in November produce higher returns and lower risks than the buy and hold strategies. Moreover, the sector and international ETFs achieve equal mean returns within November. These returns exceed the mean return of broad market ETFs being in parallel more volatile than the returns of broad market ETFs. Considering the three classes of capitalization, the findings indicate that the strategies on the seasonal patterns of ETFs' return deliver higher mean and accumulated returns than the buy and hold strategies in the period 2002-2006. Further, the performance of small cap ETFs exceeds the performance of large and medium cap ETFs but they are more volatile.

The rest of the paper is organized as follows: In Section 2 we discuss the institutional features of ETFs, their advantages and some tax considerations and in Section 3 the literature review on the various types of return seasonality on equity investments. In Section 4 we develop the methodology followed in the empirical analysis of seasonality, predictability and strategic investment implementation. The sample and the data employed are presented in Section 5 and in Section 6 we discuss the empirical results. In the final section 7 we summarize the main findings of the paper and offer some concluding comments and ideas for future research.

2. ETF Features

ETFs are usually fully invested in various broad, sector or international indexes offering investors a considerable level of risk diversification, available with just a single transaction. The level of risk among the investments on broad, sector and international indexes varies. Specifically, the broad market ETFs are assumed to be more risky in comparison to sector ETFs. Likewise, the international ETFs are even riskier since they

invest on securities traded on international stock exchanges and they are influenced by local conditions and events.

The risk of investing in ETFs can be moderated by choosing non-equity investments. ETFs are eligible to invest either in corporate bonds or in treasury bonds, both being less risky choices relative to the most common equity-linked ETFs. Also, fixed-income ETFs, which usually bear low risk, are available for investors along with commodity and real estate ETFs. All the available types of ETFs provide investors and managers with great opportunities for efficient risk management by offering a wide range of substitutional investment choices, which offer different levels of expected performance and volatility.

ETFs are cheap investment tools since they have small administrative expenses reflected on low expense ratios as a result of their passive investment character, which requires managers to simply follow the tracking indexes and not to develop complicated and high cost investing strategies. Nevertheless, we have to keep in mind that the extremely frequent trading can offset the benefits of low expense ratios.

The level of ETFs' expense ratios varies. In particular, ETFs that track broadly diversified indexes have the lowest expenses, followed by ETFs that track sector indexes and ETFs that invest in international indexes. Beyond the managerial costs, ETFs have to pay commissions to brokerage companies and their shares are subject to the bid/asked spread. These features are material handicaps for ETFs when they are compared to traditional open-ended mutual funds which are not loaded with brokerage commissions and bid/ask spreads.

ETFs provide significant trading flexibility since they offer continuous pricing and the ability to trade throughout the day unlike most mutual funds that are traded at the end of the day. Further, ETFs offer opportunities for the implementation of both passive and active trading strategies. The most common investment strategy in ETFs is the passive buy and hold strategy. The return of this strategy depends exclusively on the market performance. Also, ETFs allow the active intraday trading and enable investors to buy and sell, in essence, all of the securities that make up an entire market with a single trade. They, therefore, provide the flexibility to get into or out of a position at any time throughout the day.

Moreover, all the active trading strategies that can be used with traditional stocks can also be applied to ETFs. Among others, these strategies include market timing and sector rotation. Also, an ETF enables investors to purchase on margin, trade using limit and stop orders as well as short-selling while ETFs are exempted from the "up-tick" and "down-tick" rules.

A final strategy relates to the actively managed ETFs. While ETFs are structured to track an index, they could just as easily be designed to track the top picks of a popular investment manager, mirror any existing mutual fund or pursue a particular investment objective. These ETFs can provide investors with an investment that aims to deliver returns above the average market returns.¹

Another significant element of ETFs is the potential for high tax efficiency they offer, since they tend to generate fewer capital gains than traditional mutual funds. The tax efficiency of ETFs is based on their discrete "in kind" creation/redemption process. ETFs are created in block-sized units of 25.000, 50.000 or 100.000 shares by large investors and institutions. The creator of an ETF purchases and deposits a portfolio of stocks which approximates the composition of a specific index to a trustee. A cash

¹ While actively managed ETFs run by professional managers are not available in the United States, they offer such ETFs in Germany.

amount that represents the accumulated dividends of the underlying portfolio shares is also deposited. In return of these deposits, the creator receives a fixed number of ETF shares, the entirety of which then is usually traded on a secondary exchange market. The redemption of ETFs follows the reverse direction. The investor exchanges his own ETF shares for the portfolio of stocks plus a cash component, which is related to the realized dividends of these stocks. The buying and selling of ETF shares usually takes place among shareholders and as a result, there is no need for the ETF to sell its assets in order to meet redemptions. This advantage of ETFs restricts the realization of taxable capital gains.

The trading price of ETFs usually deviates from their corresponding net asset value providing arbitrage opportunities for big investors. If the value of the underlying portfolio of stocks is greater than the ETF price, the institutional investor will redeem the low priced units of ETF by receiving the high priced securities. In contrast, if the value of the underlying stocks is lower than the ETF price, the investor will exchange the low priced securities for a new creation unit of the ETF. This arbitrage mechanism is an on-going process which helps eliminating of the large and long-lasting deviations between ETF prices and their net assets values.

ETFs are found in three different forms. In the first form, an ETF is structured as a unit investment trust, which cannot reinvest the accumulated dividends and lend the underlying securities in order to enhance its performance. The second form is similar to traditional mutual funds, which can reinvest the dividends and lend the securities. The third form resembles the grantor trust structure, which contains a bundle of stocks in a specific industry that can be liquidated at the investor's discretion.

The "in kind" process of ETFs creation and redemption distinguishes two main categories of investors. The first one refers to the large institutional investors who have the ability to deal directly with the fund. The second category involves the retail investors who are able to acquire or sell shares of ETFs only on the stock exchange. Further, considering the investment horizon of ETFs, we distinguish two different kinds of investors. The first kind refers to the long-term investors who prefer ETFs due to their low management fees. The second kind refers to the day traders who choose ETFs to gain from intraday mis-pricings. Finally, some institutional investors like pension funds use ETFs for hedging purposes due to the restrictions they face in the usage of derivative products.

Finally, ETFs are characterized by large liquidity, which contributes to the easy and rapid trading near their fair market value and to the narrowness of bid/ask spreads and volatility. The liquidity of an ETF is not related to its daily trading volume but rather to the liquidity of the stocks comprised in the index. The high liquidity of ETFs is achieved due to the ability of market makers, which are usually large brokerage houses, to perpetually create and redeem shares of ETFs in respect of market demand.

3. Literature Review

The seasonality in stock returns has been thoroughly examined by literature. Also, the literature has defined various types of seasonality. Various studies like those of Rozeff and Kinney (1976), Roll (1983), Reinganum (1983), Keim (1983), Haugen and Lakonishok (1988), Ritter (1988), Lakonishok, Shleifer, Thaler and Vishny (1991), D'Mello, Ferris and Hwang (2003), Starks, Yong and Zheng (2006), Haug and Hirschey (2006) indicate that stocks usually achieve abnormal equally-weighted returns during January naming this finding as the January or the turn-of-the-year effect.

The literature usually relates the January effect to small-cap stocks offering several explanations for the persistence of the January effect in US markets. Lakonishok, Shleifer, Thaler and Vishny (1991) and partially Haug and Hirschey (2006) attribute the January effect to the “window dressing” behavior. According to this argument, professional investors eliminate the low performing stocks and purchase high performing stocks at the end of the year in order to amend the performance of their portfolios.

D’Mello, Ferris and Hwang (2003), Starks, Yong and Zheng (2006), Haug and Hirschey (2006) relate the January effect to the tax-loss-selling hypothesis according to which investors use to sell the stocks that experienced large capital losses before the end of the year and postpone the sale of stocks with capital gains until after the New Year. D’Mello, Ferris and Hwang (2003) suggest that the tax-loss selling behavior is mainly related to individual investors. Ritter (1988) also assumes that the January effect originates from the behavior of “small” investors.

Beyond the January effect, some other calendar effects are reported by literature. Chen and Singal (2003) reveal the existence of a December momentum in the return of winning stocks. Under the December effect hypothesis, investors postpone the selling of the winners from December to January and possibly pressure the winners to gain increased returns during the last five days of December. The authors claim that December effect is relatively easy to arbitrage and attribute its persistence to the limited knowledge about its existence.

Further, Bhabra, Dhillon and Ramirez (1999) document the existence of a November effect in stock returns related to the implementation of Tax Reform Act of 1986, which shifted the tax year-end for mutual funds from December to October. The shift of tax year-end could probably result in selling pressure within October of stocks that experienced capital losses during the year. Investors offset this way the taxable gains at the beginning of the new tax year. Gibson, Saffiedine and Titman (2000) find similar November effect in stock returns.

Some other monthly patterns in stock returns have also been detected in the literature. Ariel (1987) documents a half-month effect in the returns of US stock indexes. This effect indicates that stocks earn positive average returns at the beginning and during the first half of each month and zero mean returns during the second half of each month. Boudreaux (1995) also reports the existence of a half-month effect in stock returns of various international markets such as Denmark, France, Germany and others. Milonas (1990) has studied the issue of seasonalities in commodity markets and found a strong half-moth effect in a number of agricultural commodities.

Ariel (1987) and Lakonishok and Smidt (1988) identify a turn-of-the-month effect in U.S equity returns, which suggests that equity returns are unusually high during the period, which begins at the last trading day of each month and ends three days later.

Various studies discover the existence of a holidays effect in stock returns. Roll (1983) finds that small firm stocks present high returns on the last trading day before the new year’s day. Besides, Lakonishok and Smidt (1984) claim that the increase of returns before Christmas concerns all the deciles of market capitalization while Cadsby and Ratner (1992) find that the returns of stocks before the local holidays are materially high in Canada, Japan, Hong Kong, and Australia. Additionally, Kim and Park (1994) reveal that the holiday effect applies for US, U.K. and Japanese stock markets, even though each country has different holidays and institutional characteristics. The authors also reveal that the holiday effects in U.K. and Japan are independent of the holiday effect in U.S. stock markets.

Finally, a day-of-the-week effect has been found in the literature. French (1980) finds that stock mean returns are high on Mondays. Contrary to this finding, Smirlock and Starks (1986) find that the average return on Mondays is negative. Further, Gibbons and Hess (1981) and Keim and Stambaugh (1984) reveal that the average returns of stocks on Friday are abnormally high. A week-end effect in stock returns in the U.K., Japan, Canada and Australia is identified by Jaffe and Westerfield (1985). The authors find that the lowest mean returns for Japanese and Australian stocks occur on Tuesdays.

4. Methodology

4.1 Return

At first we isolate the closing trading values of each category and class of ETFs among the calendar months and then we calculate the average daily percentage returns of ETFs and tracking indexes for each individual month. The average daily return in each month is characterized as the “monthly” return. We compute the daily return using equation (1):

$$R_i = \frac{TV_i - TV_{i-1}}{TV_{i-1}} * 100 \quad (1)$$

where, R_i refers to the percentage return on day i and TV_i refers to the trading price of ETF on day i . We also examine the monthly returns of each class and category of ETFs in search of seasonal patterns. Afterwards, we evaluate the statistical significance of monthly returns, $MRet$, of each category and class via the following regression (2):

$$MRet = a + \sum_{i=1}^{11} b_i D_i + \varepsilon_{pt} \quad (2)$$

The dependent variable is utilized in pool basis posturing vertically all the monthly returns of each ETF. The independent variables in the model are eleven dummy variables for all months except November that take the value of 1 if the return is calculated in the specific month and the value of zero otherwise.

The model’s intercept reflects the average monthly return in November. The intercept comprises the comparative basis for the other dummies. We choose November return as the comparative benchmark since Rompotis (2007) has indicated a significant November effect in ETFs performance. The “b” coefficients count for the differences in returns between November and each of the other months. Therefore, if the intercept is statistically significantly positive and the “b” coefficients are significantly negative, we infer that a positive November pattern affects ETF returns. The term ε_{pt} represents the random error and it is expected to have zero mean. Model (2) is estimated for the entire studying period.

4.2 Risk

The next step concerns the estimation of monthly risk. The risk of ETFs is calculated as the standard deviation of daily returns for each month. The risk is estimated and presented individually for each category and class of ETFs against eleven dummies for each month except the month of November in equation (3):

$$MRisk = a + \sum_{i=1}^{11} b_i D_i + \varepsilon_{pt} \quad (3)$$

In order to be consistent with model (2), model (3) is plotted in pool basis. $MRisk$ is the dependent variable, while dummy variables representing the months of January through December, except November, are the control factors of the model.

According to the model, the intercept account for the November risk and operates as the benchmark for the other monthly dummies. As in model (2), the b coefficients measure the difference in risks between November and the other months. If there is a positive November effect in ETFs risks, we expect the b coefficients to be negative and statistically significant. The term ε_{pt} is the random error and it is expected to have zero mean. Model (3) is estimated for the entire period 2002-2006.

4.3 Tracking Error

The tracking error of ETFs reflects the divergence in the performance of ETFs and the index portfolios. We calculate the tracking error for all the categories of ETFs in each month by applying the most commonly used method in the literature of tracking error measurement [e.g see Frino and Gallagher (2001)], which computes the standard deviation of return differences between ETFs and indexes as follows:

$$TE_P = \sqrt{\frac{1}{n-1} \sum_{t=1}^n (e_{pt} - \bar{e}_p)^2} \quad (4)$$

where e_{pt} is the difference of returns in day t and \bar{e}_p is the average difference in returns over n days. The seasonality in monthly tracking errors, MTrack, is examined for each individual ETF category via model (5) using the eleven monthly dummies as previously described:

$$MTrack = a + \sum_{i=1}^{11} b_i D_i + \varepsilon_{pt} \quad (5)$$

As before “b” coefficients measure the difference in tracking error of November and the other months. If there is a positive November effect in ETFs tracking error, the estimations of “b” coefficients should be either insignificant or negative and statistically significant. The term ε_{pt} represents the random error. Model (5) is estimated for the entire studying period.

4.4 Ex-Post Comparison of Trading Strategies

The last empirical issue in the current study concerns the ex-post comparison in returns of various theoretically implemented investing strategies which take into account the seasonal patterns in returns and risks of the various categories of ETFs. The implementation of investing strategies exploiting the seasonality of return and risk depends on whether the categories and classes of ETFs present similar or different seasonal patterns. The implementation of the strategies also depends on the willingness of investors to buy and sell ETF shares anytime during a year.

The seasonality-based strategies are compared to two alternative buy and hold strategies. We structure the first buy and hold strategy by purchasing an average ETF portfolio on the first day of each year and holding it until the end of the year. Considering the classification of ETFs according to market categories, the buy and hold portfolio consists by one third of broad ETFs, one third of sector ETFs and one third of international ETFs. These weights are also applied for the comparative average portfolio in the case of ETFs segmentation under the classes of capitalization.

The second buy and hold strategy is implemented by purchasing a portfolio of ETFs, which receive four or five stars in the rating system of Morningstar on the first day of each year and held until the end of the year. This strategy does not consider the market segmentation or the size of capitalization.

5. Data

Our sample consists of 83 equity ETFs during the period 2002-2006. We concentrate only on equity ETFs since the relative literature focuses on the seasonal return of stocks or equity mutual funds. Further, we choose the five years period to have a long-run aspect of ETFs and to implement material comparisons from year to year during the studying period.

The sample exclusively includes ETFs with complete daily trading data for all years of the period 2002-2006. Based on this requirement, the sample includes 73 Barclays iShares, which cover a variety of domestic, international equity portfolios, the Diamonds Trust series, which track the Dow Jones Industrials Index, the SPDRS and MidCap SPDRS, which replicate the return of S&P 500 and S&P 400 Indexes, respectively, the Nasdaq-100 Index Tracking Stock (QQQQ), and 6 streetTRACKS, which invest on various Dow Jones U.S. or global indexes.

All the selected ETFs trade on the NASDAQ Exchange and the relevant price for the calculation of return and risk data were extracted from its webpage. The prices of the tracked indexes are gathered from several resources. Nasdaq.com offers the closing values of Nasdaq-100 Index, the S&P 500 Index, the S&P 400 Index and the Dow Jones Industrial Average Index. Further, iShares.com provides the prices of the underlying indexes of iShares. Finally, the web site of Dow Jones indexes offers the prices of streetTRACKS benchmarks. We use the closing values of indexes to estimate the return of ETF benchmarks and, consequently, we compound the returns of ETFs and indexes to compute the tracking error of ETFs.

Finally, we allocate ETFs in broad, sector and international groups considering the categorization of ETFs from the NASDAQ exchange. We also consider the classification by capitalization provided by the NASDAQ exchange in order to rank ETFs in small, median and large classes. Finally, the NASDAQ exchange publishes the star rating of ETFs. This segmentation of ETFs allows the examination of the various potentially profitable trading strategies.

6. Empirical Results

5.1 Return

This section provides an analysis of the monthly ETF returns considering their various groups according to the categorization by market and capitalization. Table 1 presents monthly returns which reflect the average daily return of ETFs within each single month along with the number of ETFs included in each category.

Table 1 reveals that November mean returns in each of the six categories are by far greater than the returns in the other months. Among the returns of other months, October returns are the second highest and are much closer to November returns than to returns of the other months. More specifically, the results of broad market ETFs show that the return of this category is subject to a significant November effect in two of five years in the period 2002-2006. Also, November return is steadily positive during the whole period contrasting other months that present either positive or negative returns. In period's mean terms November return is equal to 21 b.p. The period's mean returns of other months are inferior to November return. For example, October return equals the 15 b.p. being the second highest monthly return.

The results of sector ETFs are quite similar to these of broad ETFs while the results of international ETFs slightly differentiate from the results of broad and sector ETFs. Similar observation can be made for ETF groups categorized by market

capitalization. The November effect is present in all three classifications as judged by the highest November returns relatively to the returns in the other months.

Table 2 reports results of t-tests applied in evaluating the statistical significance in return differences between November and those of the other months. To test the significance of return differences, we subtract the return of each month from the November return and we apply t-tests in order to assess if these differences are statistically different than zero. The results indicate that the differences in mean returns between November and the other months are positive and statistically significant at the 5% level or better. This pattern applies to all the individual groups of ETFs supporting the existence of a strong November effect in ETF returns.

Table 3 presents the results of the pool regression model (2) on the statistical significance of return differences between November and the other months during the entire period 2002-2006 considering both the classifications of ETFs per market category and per class of capitalization. The coefficients show that the November return is significantly higher than the return of other months during the entire studying period for all the ETF market categories and classes of capitalization. In agreement to our expectations, all “a” estimates, which reflect the average monthly return in November, are positive and significant at the 1% level. In addition, all “b” estimates, which count for the differences in returns between November and each of the other months, are negative and highly significant. The statistical significance of the estimates is also confirmed by the values of individual F-statistics which are all high and significant at the 1% level. F-statistic measures the joint significance of the dummy variables.

The analysis of monthly return’s estimations indicate that the November effect in performance is present in all the individual ETF categories or classes. This seasonal anomaly in performance offers opportunities to traders to receive prominent returns if they exploit them accordingly.

5.2 Risk

Monthly risk of ETFs is analyzed in this section by considering the individual classes of ETFs in Table 4. Monthly risk of ETFs is calculated as the standard deviation of daily returns. According to the results, the broad, sector, and international ETFs steadily present the lowest monthly volatility in November and December during the entire period of 2002-2006. We also observe that the overall average monthly risk in the five-year period is similar for broad and sector market ETFs (100 b.p. and 101 b.p., respectively) suggesting similar diversification benefits. Yet, the international ETFs are characterized by a much greater monthly risk (132 bp). This suggests that the investment choices offered by international markets ETFs are more appropriate for investors with greater risk tolerance.

The results of ETF groups categorized by market capitalization are quite similar to these of broad, sector and international ETF groups. Specifically, the large, medium and small cap ETFs present the lowest monthly risk in November and December for almost all the single years in the period 2002-2006 while they present the lowest mean volatility in November and December during the entire studying period. Comparing the risk of each separate class, we observe that the large cap ETFs are overall more volatile than medium and small cap ETFs. Particularly, the overall average monthly risk of large cap ETFs in the five-year period is equal to 121 b.p. while the relevant risk levels of medium and small cap ETFs are 104 b.p. and 115 b.p., respectively.

Table 5 provides the results of t-tests analysis to assess the statistical significance of the differences in risks between November and other months. Overall, t-statistics for the entire period 2002-2006 are negative and significant at the 10% level or

better. The results of the single years are basically in line with the overall results with a few exceptions.

Table 6 presents the results of equation (3) which evaluates the statistical significance in risk differences between November and the other months during the entire period 2002-2006. The results are presented in two panels for the ETFs categorized by the trade market and the class of capitalization, respectively. The “a” estimates of all groups are positive and statistically significant at the 1% level while the majority of “b” estimates are positive and significant at the 10% or better. The positive sign of “b” estimates does not apply to December’s coefficients that are all negative and significant (except the estimate of international ETFs which is negative but insignificant), indicating that the risk of ETFs in November is higher than their risk in December. The explanatory power of the model applied in assessing the seasonal patterns in ETFs’ risk is affirmed by the estimates of F-statistics which are all high and significant at the 1% level.

Overall, the results in Tables 4,5 and 6 reveal the existence of a strong November effect with respect to all other months except December. Statistically significant results show that December volatility is even lower than November’s volatility.

5.3 Tracking Error

The monthly tracking error’s estimations of the various ETF categories are analyzed in this section. Table 7 reports the monthly tracking error of ETFs which is estimated as the standard deviation of the difference between the performance of ETFs and indexes. According to the results, throughout the grouping of ETFs in markets coverage and capitalization, the November mean tracking error is the lowest among the mean tracking errors in the other months with a few exceptions.

The broad market ETFs achieve on average their best replication performance in November since the mean November tracking error of the period is the lowest among all mean monthly tracking errors equaling the 26 b.p. Further, November tracking error is the lowest between all monthly tracking errors during 2004 and 2006. The sector market ETFs also present the period’s lowest mean tracking error, which equals the 32 b.p. in November. The same pattern applies for international market ETFs, whose mean November tracking error is equal to 80 b.p. The results of sector and international ETFs for each individual year indicate that November tracking error is the lowest monthly tracking error in 2003 and 2004 for sector ETFs while it is the lowest monthly tracking in 2003, 2004 and 2005 for international ETFs. These results indicate the existence of a significant reverse November effect in ETFs replication efficiency.

The comparison of monthly tracking errors among the marker categories of ETFs shows that the broad ETFs apply more efficiently their replication strategies in relation to sector and international ETFs. Also, sector ETFs suffer from smaller replication errors than international ETFs. The tracking error of the latter amounts to an overall five-year average of 80bp, more than twice the tracking errors of broad and sector ETFs (26bp and 32 bp, respectively). When classified by capitalization, the tracking error of the large cap ETFs (53 bp) is much greater than the tracking error of medium and small cap ETFs (25bp and 31bp, respectively).

Table 8 provides the results of t-tests applied on the differences between the tracking error of November and the other months. The t-tests evaluate the statistical significance of these differences. Overall, the results confirm the existence of the strong reverse November effect in tracking error of all ETFs irrespective of the market segmentation or the magnitude of capitalization. T-tests for the entire period 2002-2006

are mostly negative and significant at the 10% level or better. No positive estimations are detected except the estimations of small cap ETFs regarding February, March and April which are positive but statistically insignificant indicating that there is no any substantial difference in tracking errors among these months and November.

Table 9 presents the results of equation (5) which estimates the significance of the tracking error differences in November from the other months. The results are presented considering separately the categorization of ETFs by the market of trade and the class of capitalization, respectively. The “a” estimates of all the groups are positive and statistically significant at the 1% level. Further, the majority of “b” estimates are positive and significant at the 10% or better confirming the existence of the reverse November effect in tracking error of ETFs. Yet, the “b” estimates of small cap ETFs in February, March and April are negative but insignificant indicating no essential difference in tracking errors among these months and November. Additionally, the values of F-statistics are significant at the 1% level for all market ETFs and for large cap ETFs but F-statistics are insignificant for medium and small cap ETFs while the statistical significance of “b” coefficients for these groups is also limited.

5.4 Ex-Post Comparison of Trading Strategies

In this section we present ex-post risk and return estimates that could be achieved by investors had they implemented investment strategies that exploit the seasonal patterns of ETFs. Having shown a strong positive November effect we apply the comparison assuming that investors apply seasonality-based strategies only during November. In other words, we compare on a year-by-year basis the return and risk earned during November in each ETF category or class to the relevant return and risk earned by the buy and hold strategies.

Assuming that the return distribution is not month specific, we calculate the annualized total November return of each average portfolio by multiplying the average daily November return by 12 to make it comparable with returns from an investment over the entire year. In order to calculate the total annual return of buy and hold strategies we multiply the average annual daily return (mean daily return of all months in a year) of the average portfolios by 12. The annualized November risk and the total annual risk are estimated in the same way to the estimation of returns by multiplying the relevant risks by the square root of 12. We consider two alternative buy and hold strategies which regard the annual sustention of the average market or capitalized portfolio and the yearly sustention of the average Morningstar portfolio.

Table 10 presents the average returns and risks delivered by the seasonal-based strategies and the buy and hold strategies. The table records the return and risk in each single year along with the period’s mean and accumulated return and risk. Regarding market ETFs we see that the three seasonality-based strategies clearly beat the buy and hold strategies in three of five years. In specific, the return of broad, sector and international ETFs exceeds the performance of buy and hold strategies during 2002, 2004 and 2005. However, the return of sector ETFs is equal to the return of the second buy and hold strategy in 2004.

Considering the mean return of the period, November investing significantly outperforms the “long-run” strategies. The mean return of broad, sector and international ETFs is 254, 269 and 404 b.p. correspondingly while the mean returns of the two alternative buy and hold strategies are 194 and 209 b.p. respectively. November investing also delivers greater accumulated return than the buy and hold strategies. The accumulated return of broad, sector and international ETFs is 1272 b.p., 1344 and 1296

b.p. correspondingly while the two buy and hold strategies derive returns equal to 972 and 1044 b.p. respectively.

The results indicate that the seasonality-based strategies are permanently less risky than the buy and hold strategies on the annual, average and accumulated levels.² For example, the mean risk of sector ETFs, which are the most risky ETFs, is 4.04 while the mean risks of the two buy and hold strategies are 14.25 and 12.15 respectively. The risk greater risk associated with the buy and hold strategies is expected since ETF prices have greater fluctuations in the long-run period than in the short-run period. The long-run fluctuation is related to the larger number of events and flow of information emerged during a whole year compared to the news released during November.

Similar observation can be made for ETF groups categorized by market capitalization. The seasonality-based strategies outperform the buy hold strategies in 2002, 2004 and 2005. The mean return of large, medium and small cap ETFs is 233, 278 and 324 b.p. respectively while the mean returns of the two buy and hold strategies are 199 and 209 b.p. correspondingly. The seasonality-based strategies also deliver greater accumulated return than the buy and hold strategies. The accumulated return of large, medium and small cap ETFs is 1164 b.p., 1392 and 1620 b.p. correspondingly while the accumulated returns of the two buy and hold strategies are equal to 996 and 1044 b.p. respectively.

Considering the risk of pursuing either seasonality-based or buy and hold strategies, the results indicate that the seasonality-based strategies are steadily less volatile than the buy and hold strategies on the annual, average and accumulated levels. The mean risk of large, medium and small cap ETFs is 3.67, 3.43 and 3.67 respectively while the mean risks of the two buy and hold strategies are 13.57 and 12.15 correspondingly. Additionally, the accumulated risk of the large, medium and small cap ETFs is 18.33, 17.15 and 18.33 correspondingly while the relevant risks of the two alternative buy and hold strategies are 67.86 and 60.73.

7. Summary and Future Research

This study focuses on the seasonality patterns in ETF monthly performance, volatility and tracking ability. Using a sample of 83 equity ETFs in the five year period 2002-2006, we demonstrate the existence of the November effect. The monthly term respectively implies the average daily return within a specific month, the standard deviation of daily returns in this month and the standard deviation of daily return differences among ETFs and indexes within the month.

For the purposes of the study, ETFs were classified according to the investment segment of the market (broad, sector, international) and according to market capitalization (large, medium, small).

Considering monthly returns, the results indicate that the November returns of all ETF groups are always positive during the whole studying period while the other months are either positive or negative. Also, the period's mean November return of all ETF groups outperforms the period's mean returns of all the other calendar months.

The risk analysis demonstrates that the volatility of all ETF categories or classes is subject to a significant November but also a significant December effect. The November risk is the lowest among the risks in the other months except the month of

² The "annual" term denotes the year and it does not necessarily reflect the investment's duration which can alternatively be equal to one month or one year.

December. The period's mean December risk of all ETF groups is entirely the lowest among all monthly risks being simultaneously the lowest monthly risk for the majority of ETF groups roughly within all the years of the studying period.

Regarding tracking error, the results indicate that ETFs achieve their best replication records during November of each year. This strong reverse November effect in tracking error concerns all the single categories and classes of ETFs. The period's mean November tracking error of all ETFs is dominantly the lowest among all monthly tracking errors.

Next, we perform an ex-post comparison of the return and risk received by the seasonality-based and buy and hold strategies respectively. We assume that investors, who follow seasonality-based strategies, invest in the various groups of ETFs only during November of each year. Also, we consider two alternative buy and hold strategies; the first one regards investing in the average market or capitalized portfolio for the entire year while the second one regards the investment in the average Morningstar portfolio for the entire year.

The ex-post comparison reveals that the seasonality-based strategies clearly beat the buy and hold strategies, on the average, and on the accumulated level during the period 2002-2006. This pattern applies to all ETF market categories or capitalization's classes. However, the seasonality-based strategies do not permanently beat the buy and hold strategies in every single year of the studying period. In addition, the comparison indicates that investing during November is substantially less risky than the buy and hold strategies, a reasonable result.

Finally, further research should be conducted on the seasonality in return and risk of ETFs searching for the existence of other effects such as the half month effect, turn-of-the-month effect, and Christmas, New Year's day or other holidays effects. Moreover, one could search if the holdings of ETF portfolios are seasonally affected and how the probably seasonal portfolio rebalances influences the performance and risk of ETFs. Finally, considering the issue of seasonality-based strategies against the buy and hold strategies, we should investigate the administrative and transaction costs of the seasonality-based and buy and hold strategies. This expansion is strongly desirable since the current paper only compares the performance and risk received by the seasonality-based and the buy and hold strategies without consideration to the costs born by these strategies.

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Table 1: Monthly Return of ETFs

This table reports the average daily return of broad, sector and international ETFs and the return of large, medium and large cap ETFs for each calendar month in closing prices terms within the period 2002-2006. Table also presents the mean monthly return within each year and the mean return within each single month during the whole studying period. N represents the number of ETFs within each category.

	<i>Market Categories</i>						<i>Capitalization's Classes</i>					
	Broad Markets ETFs						Large Cap ETFs					
Mon	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Jan	-0.06	-0.12	0.12	-0.14	0.22	0.00	-0.12	-0.07	0.13	-0.12	0.27	0.02
Feb	-0.09	-0.09	0.08	0.13	0.01	0.01	0.04	-0.09	0.11	0.20	-0.03	0.05
Mar	0.26	0.05	-0.03	-0.10	0.10	0.06	0.26	0.00	-0.06	-0.14	0.09	0.03
Apr	-0.16	0.38	-0.13	-0.15	0.05	0.00	-0.10	0.42	-0.17	-0.10	0.17	0.04
May	-0.08	0.33	0.09	0.22	-0.17	0.08	-0.02	0.34	0.07	0.14	-0.21	0.06
Jun	-0.38	0.06	0.11	0.05	0.00	-0.03	-0.26	0.07	0.10	0.04	0.02	-0.01
Jul	-0.42	0.15	-0.21	0.23	-0.05	-0.06	-0.49	0.12	-0.17	0.22	0.03	-0.06
Aug	0.05	0.14	0.00	-0.05	0.10	0.05	0.08	0.14	0.04	0.03	0.12	0.08
Sep	-0.49	-0.07	0.10	0.03	0.07	-0.07	-0.72	0.02	0.13	0.12	0.08	-0.07
Oct	0.31	0.29	0.09	-0.12	0.18	0.15	0.44	0.28	0.14	-0.13	0.17	0.18
Nov	0.34	0.12	0.27	0.21	0.12	0.21	0.29	0.09	0.27	0.16	0.16	0.19
Dec	-0.29	0.15	0.12	-0.03	0.01	-0.01	-0.23	0.23	0.12	0.04	0.05	0.04
Mean	-0.09	0.12	0.05	0.02	0.05	0.03	-0.07	0.13	0.06	0.04	0.08	0.05
N	33	33	33	33	33	33	63	63	63	63	63	63
	Sector Markets ETFs						Medium Cap ETFs					
Mon	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Jan	-0.13	-0.08	0.17	-0.21	0.27	0.00	-0.08	-0.09	0.19	-0.22	0.30	0.02
Feb	-0.16	-0.02	0.08	0.16	-0.03	0.01	0.01	-0.04	0.12	0.17	0.04	0.06
Mar	0.28	0.04	-0.04	-0.12	0.10	0.05	0.29	0.08	0.07	-0.12	0.12	0.09
Apr	-0.29	0.36	-0.22	-0.06	0.03	-0.04	-0.06	0.32	-0.28	-0.04	-0.02	-0.02
May	-0.06	0.41	0.12	0.20	-0.20	0.09	-0.04	0.40	0.16	0.22	-0.18	0.11
Jun	-0.41	0.03	0.09	0.05	0.03	-0.04	-0.27	0.04	0.10	0.13	0.05	0.01
Jul	-0.38	0.11	-0.19	0.27	0.02	-0.03	-0.33	0.20	-0.16	0.30	-0.03	0.00
Aug	0.05	0.15	0.02	-0.01	0.14	0.07	0.02	0.12	0.10	-0.03	0.10	0.06
Sep	-0.62	-0.02	0.11	0.05	0.09	-0.08	-0.38	-0.01	0.08	0.01	0.05	-0.05
Oct	0.43	0.24	0.14	-0.13	0.17	0.17	0.12	0.22	0.14	-0.13	0.23	0.12
Nov	0.46	0.10	0.24	0.17	0.15	0.22	0.30	0.18	0.28	0.22	0.18	0.23
Dec	-0.34	0.19	0.11	-0.02	-0.02	-0.02	-0.16	0.11	0.19	0.01	-0.05	0.02
Mean	-0.10	0.13	0.05	0.03	0.06	0.03	-0.05	0.13	0.08	0.04	0.06	0.05
N	24	24	24	24	24	24	12	12	12	12	12	12
	International Markets ETFs						Small Cap ETFs					
Mon	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Jan	-0.06	-0.04	0.15	-0.08	0.39	0.07	0.00	-0.13	0.17	-0.16	0.39	0.05
Feb	0.08	-0.16	0.18	0.28	-0.04	0.07	-0.14	-0.15	0.10	0.12	0.00	-0.01
Mar	0.29	-0.05	-0.02	-0.18	0.12	0.03	0.37	0.03	0.04	-0.13	0.20	0.10
Apr	0.04	0.48	-0.23	-0.09	0.31	0.10	0.05	0.43	-0.23	-0.26	0.01	0.00
May	-0.01	0.35	0.06	0.07	-0.26	0.04	-0.20	0.44	0.11	0.31	-0.23	0.09
Jun	-0.25	0.11	0.13	0.10	0.04	0.03	-0.30	0.07	0.20	0.15	0.00	0.02
Jul	-0.49	0.17	-0.14	0.22	0.07	-0.03	-0.63	0.27	-0.28	0.31	-0.14	-0.09
Aug	0.07	0.15	0.11	0.11	0.12	0.11	0.04	0.22	-0.03	-0.07	0.10	0.05
Sep	-0.66	0.10	0.19	0.22	0.05	-0.02	-0.38	-0.11	0.21	0.02	0.02	-0.05
Oct	0.35	0.30	0.18	-0.17	0.21	0.17	0.17	0.37	0.10	-0.16	0.24	0.14
Nov	0.26	0.12	0.34	0.14	0.22	0.22	0.37	0.20	0.39	0.25	0.14	0.27
Dec	-0.21	0.25	0.15	0.12	0.10	0.08	-0.25	0.06	0.08	-0.06	-0.01	-0.04
Mean	-0.05	0.15	0.09	0.06	0.11	0.07	-0.07	0.14	0.07	0.02	0.06	0.04
N	26	26	26	26	26	26	8	8	8	8	8	8

Table 2: T-tests on the Return Differences between November and the other Months

This table reports the t-tests which count for the statistical significance of the differences in returns between November and the other months. t-tests are presented for the broad, sector and international ETFs and for the return of large, medium and large cap ETFs within the period 2002-2006. N represents the number of ETFs within each category.

	<i>Market Categories</i>						<i>Capitalization's Classes</i>					
	Broad Markets ETFs						Large Cap ETFs					
	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Mon	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st
Jan	15.80 ^a	15.33 ^a	13.72 ^a	-17.16 ^a	-5.8 ^a	41.25 ^a	9.54 ^a	5.69 ^a	5.18 ^a	11.55 ^a	-5.8 ^a	13.58 ^a
Feb	10.33 ^a	9.36 ^a	12.80 ^a	9.76 ^a	10.9 ^a	15.26 ^a	5.58 ^a	6.93 ^a	10.42 ^a	-1.23	7.2 ^a	9.38 ^a
Mar	4.67 ^a	4.31 ^a	41.24 ^a	9.22 ^a	2.12 ^b	46.45 ^a	2.80 ^a	3.72 ^a	15.63 ^a	13.11 ^a	4.3 ^a	13.61 ^a
Apr	12.42 ^a	-18.25 ^a	15.00 ^a	-13.96 ^a	5.75 ^a	19.80 ^a	8.37 ^a	-13.6 ^a	14.36 ^a	10.52 ^a	-0.27	9.90 ^a
May	15.30 ^a	-19.09 ^a	13.24 ^a	-4.46 ^a	20.8 ^a	19.69 ^a	8.49 ^a	-9.98 ^a	9.85 ^a	1.52 ^a	13.9 ^a	13.70 ^a
Jun	24.67 ^a	4.18 ^a	22.62 ^a	-16.39 ^a	20.5 ^a	29.46 ^a	11.23 ^a	0.56	11.44 ^a	5.48 ^a	8.9 ^a	12.73 ^a
Jul	23.43 ^a	-2.67 ^b	18.95 ^a	3.05 ^a	7.68 ^a	21.37 ^a	15.71 ^a	-1.16	16.56 ^a	-3.47 ^a	5.2 ^a	14.96 ^a
Aug	14.08 ^a	-2.76 ^a	14.55 ^a	-6.50 ^a	2.77 ^a	20.93 ^a	6.37 ^a	-1.80 ^c	11.61 ^a	5.44 ^a	1.9 ^c	10.29 ^a
Sep	34.84 ^a	10.43 ^a	24.33 ^a	7.88 ^a	4.35 ^a	46.46 ^a	15.86 ^a	3.18 ^a	10.19 ^a	1.67 ^c	3.6 ^a	16.88 ^a
Oct	1.45	-20.63 ^a	12.06 ^a	-20.92 ^a	-7.8 ^a	6.90 ^a	-2.03 ^b	-8.11 ^a	7.57 ^a	13.68 ^a	-0.37	2.86 ^a
Dec	21.24 ^a	-1.09	7.72 ^a	-36.69 ^a	9.03 ^a	17.64 ^a	9.90 ^a	-6.22	7.59 ^a	6.04 ^a	5.5 ^a	9.35 ^a
N	33	33	33	33	33	33	63	63	63	63	63	63
	Sector Markets ETFs						Medium Cap ETFs					
	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Mon	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st
Jan	6.52 ^a	4.78 ^a	1.13	6.65 ^a	-5.4 ^a	4.29 ^a	4.61 ^a	7.76 ^a	2.81 ^b	9.93 ^a	-7.0 ^a	15.33 ^a
Feb	3.59 ^a	4.19 ^a	5.36 ^a	0.17	2.9 ^a	6.73 ^a	4.07 ^a	5.86 ^a	6.71 ^a	1.21	3.8 ^a	11.27 ^a
Mar	2.35 ^b	1.92 ^c	8.65 ^a	8.03 ^a	2.3 ^b	9.35 ^a	0.34	1.78	5.20 ^a	17.12 ^a	7.4 ^a	16.55 ^a
Apr	5.52 ^a	-5.20 ^a	7.53 ^a	4.23 ^a	2.8 ^a	4.38 ^a	3.61 ^a	-2.50 ^b	7.47 ^a	4.30 ^a	3.8 ^a	12.57 ^a
May	4.98 ^a	-6.07 ^a	2.67 ^b	-0.71	8.1 ^a	6.43 ^a	5.03 ^a	-3.00 ^b	1.93 ^c	-0.15	18.2 ^a	10.18 ^a
Jun	5.57 ^a	2.31 ^b	12.12 ^a	2.74 ^b	4.1 ^a	5.49 ^a	6.11 ^a	4.53 ^a	11.46 ^a	3.07 ^b	7.2 ^a	11.10 ^a
Jul	7.90 ^a	-0.39	7.57 ^a	-3.25 ^a	2.4 ^b	4.22 ^a	12.41 ^a	-0.35	9.00 ^a	-2.24 ^b	6.2 ^a	7.00 ^a
Aug	4.20 ^a	-1.13	4.27 ^a	4.07 ^a	0.24	4.62 ^a	7.77 ^a	1.10	2.66 ^b	4.85 ^a	3.8 ^a	17.69 ^a
Sep	7.26 ^a	3.61 ^a	4.80 ^a	3.04 ^a	1.32	4.71 ^a	14.81 ^a	8.16 ^a	6.09 ^a	10.80 ^a	8.5 ^a	23.83 ^a
Oct	0.32	-3.40 ^a	2.92 ^a	6.97 ^a	-0.60	2.13 ^b	3.38 ^a	-0.79	3.32 ^a	25.88 ^a	-1.9 ^c	10.21 ^a
Dec	5.29 ^a	-2.02 ^c	3.18 ^a	5.05 ^a	3.8 ^a	4.12 ^a	4.83 ^a	2.01 ^c	2.62 ^b	6.98 ^a	6.0 ^a	10.42 ^a
N	24	24	24	24	24	24	12	12	12	12	12	12
	International Markets ETFs						Small Cap ETFs					
	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Mon	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st
Jan	4.16 ^a	2.53 ^b	5.04 ^a	7.61	-4.3 ^a	5.55 ^a	4.60 ^a	20.15 ^a	11.39 ^a	15.42 ^a	-14. ^a	17.10 ^a
Feb	2.74 ^b	5.20 ^a	6.53 ^a	-5.13	8.9 ^a	7.90 ^a	4.64 ^a	15.17 ^a	12.71 ^a	7.18 ^a	10.9 ^a	12.84 ^a
Mar	-0.48	3.30 ^a	7.80 ^a	7.25	3.3 ^a	8.27 ^a	-0.11	7.02 ^a	27.90 ^a	17.98 ^a	-5.0 ^a	20.72 ^a
Apr	3.44 ^a	-7.98 ^a	11.88 ^a	6.45	-3.6 ^a	7.51 ^a	3.40 ^b	-15.2 ^a	22.03 ^a	33.47 ^a	17.1 ^a	16.65 ^a
May	5.11 ^a	-4.69 ^a	9.31 ^a	3.67	11.5 ^a	8.99 ^a	8.43 ^a	-8.52 ^a	16.35 ^a	-5.34 ^a	17.9 ^a	13.86 ^a
Jun	9.06 ^a	0.08	6.55 ^a	1.49	6.7 ^a	10.43 ^a	8.65 ^a	7.27 ^a	12.67 ^a	6.61 ^a	17.2 ^a	12.79 ^a
Jul	10.31 ^a	-0.83	11.95 ^a	-2.59	5.0 ^a	9.48 ^a	15.38 ^a	-2.20 ^c	22.51 ^a	-5.96 ^a	14.2 ^a	27.04 ^a
Aug	3.26 ^a	-0.45	7.06 ^a	0.92	4.3 ^a	4.78 ^a	5.35 ^a	-0.69	18.86 ^a	29.94 ^a	2.1 ^c	19.81 ^a
Sep	11.71 ^a	0.41	5.64 ^a	-2.12 ^b	6.2 ^a	10.16 ^a	13.02 ^a	19.99 ^a	9.72 ^a	13.56 ^a	8.4 ^a	24.82 ^a
Oct	-1.33	-3.67 ^a	4.87 ^a	9.39	0.76	2.55 ^a	6.25 ^a	-11.2 ^a	13.51 ^a	19.26 ^a	-6.3 ^a	20.25 ^a
Dec	5.52 ^a	-3.70 ^a	6.01 ^a	0.86	3.8 ^a	6.35 ^a	7.61 ^a	13.80 ^a	9.10 ^a	22.62 ^a	12.6 ^a	27.83 ^a
N	26	26	26	26	26	26	8	8	8	8	8	8

^a Significant at 0.01% level, ^b Significant at 0.05% level, ^c Significant at 0.10% level

Table 3: Regression Results in ETF Return's Seasonality

This table reports the coefficients of a pool regression model, which evaluates the statistical significance of the differences in ETF returns between November and the other months within the period 2002-2006. The dependent variable of the model is the monthly return of ETFs in pool shape and the independent variables are dummy variables, which take the value 1 or 0 according to the month of reference.

	<i>Market Categories</i>					
	Broad Markets ETFs		Sector Markets ETFs		International Markets ETFs	
Month	Coefficients	T-stat	Coefficients	T-stat	Coefficients	T-stat
Nov	0.21	25.04 ^a	0.22	9.91 ^a	0.22	13.81 ^a
Jan	-0.21	-13.29 ^a	-0.22	-6.39 ^a	-0.15	-5.38 ^a
Feb	-0.20	-15.97 ^a	-0.22	-5.77 ^a	-0.15	-6.30 ^a
Mar	-0.16	-12.35 ^a	-0.17	-6.68 ^a	-0.19	-7.49 ^a
Apr	-0.21	-9.81 ^a	-0.26	-6.25 ^a	-0.12	-3.39 ^a
May	-0.13	-7.23 ^a	-0.13	-3.64 ^a	-0.17	-6.38 ^a
Jun	-0.24	-13.02 ^a	-0.26	-6.98 ^a	-0.19	-7.94 ^a
Jul	-0.27	-11.36 ^a	-0.26	-6.55 ^a	-0.25	-7.40 ^a
Aug	-0.16	-13.75 ^a	-0.15	-5.18 ^a	-0.11	-4.78 ^a
Sep	-0.28	-12.85 ^a	-0.30	-6.53 ^a	-0.24	-6.37 ^a
Oct	-0.06	-4.15 ^a	-0.05	-2.04 ^b	-0.04	-1.73 ^c
Dec	-0.22	-11.51 ^a	-0.24	-5.60 ^a	-0.14	-4.93 ^a
F-Stat	35.58 ^a		13.21 ^a		10.38 ^a	
	<i>Capitalization's Classes</i>					
	Large Cap ETFs		Medium Cap ETFs		Small Cap ETFs	
Month	Coefficients	T-stat	Coefficients	T-stat	Coefficients	T-stat
Nov	0.21	18.78 ^a	0.23	17.34 ^a	0.27	15.06 ^a
Jan	-0.18	-10.72 ^a	-0.21	-6.44 ^a	-0.22	-5.26 ^a
Feb	-0.18	-9.94 ^a	-0.17	-8.32 ^a	-0.28	-9.67 ^a
Mar	-0.18	-12.78 ^a	-0.14	-6.13 ^a	-0.17	-5.06 ^a
Apr	-0.18	-7.84 ^a	-0.25	-6.37 ^a	-0.18	-3.92 ^a
May	-0.14	-7.93 ^a	-0.12	-3.58 ^a	-0.27	-5.87 ^a
Jun	-0.23	-12.10 ^a	-0.22	-7.70 ^a	-0.24	-6.92 ^a
Jul	-0.25	-11.62 ^a	-0.24	-6.13 ^a	-0.36	-5.82 ^a
Aug	-0.13	-8.61 ^a	-0.17	-7.42 ^a	-0.22	-7.68 ^a
Sep	-0.27	-10.69 ^a	-0.28	-9.74 ^a	-0.32	-8.47 ^a
Oct	-0.03	-2.22 ^b	-0.12	-4.55 ^a	-0.13	-3.46 ^a
Dec	-0.18	-8.64 ^a	-0.21	-7.41 ^a	-0.30	-9.56 ^a
F-Stat	33.72 ^a		8.66 ^a		8.75 ^a	

^a Significant at 0.01% level, ^b Significant at 0.05% level

Table 4: Monthly Risk of ETFs

This table reports the average risk of broad, sector and international ETFs and the risk of large, medium and large cap ETFs for each calendar month for each calendar month in standard deviation terms within the period 2002-2006. Table also presents the mean monthly risk within each year and the mean risk within each single month during the whole studying period. N represents the number of ETFs within each category.

	<i>Market Categories</i>						<i>Capitalization's Classes</i>					
	Broad Markets ETFs						Large Cap ETFs					
Mon	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Jan	1.14	1.49	0.75	0.79	0.75	0.98	1.41	1.85	1.12	0.91	1.08	1.27
Feb	1.29	1.18	0.78	0.76	0.66	0.93	1.44	1.45	0.96	0.80	0.85	1.10
Mar	1.06	1.61	1.07	0.69	0.64	1.01	1.24	1.93	1.32	0.87	0.83	1.24
Apr	1.11	1.11	0.92	1.04	0.70	0.98	1.38	1.41	1.12	1.11	0.84	1.17
May	1.41	1.06	0.95	0.71	0.96	1.02	1.32	1.28	1.33	0.83	1.21	1.20
Jun	1.46	1.06	0.77	0.61	1.25	1.03	1.75	1.21	1.06	0.71	1.51	1.25
Jul	2.67	1.05	0.83	0.65	1.12	1.26	3.16	1.25	0.97	0.77	1.23	1.48
Aug	2.11	0.84	0.95	0.69	0.66	1.05	2.43	0.95	0.97	0.86	0.75	1.19
Sep	1.88	1.05	0.69	0.64	0.68	0.99	2.28	1.17	0.90	0.79	0.87	1.20
Oct	2.29	0.85	0.85	1.09	0.61	1.14	2.98	1.01	0.97	1.14	0.73	1.37
Nov	1.61	0.88	0.65	0.60	0.69	0.89	1.94	1.00	0.85	0.73	0.77	1.06
Dec	1.18	0.81	0.68	0.60	0.56	0.77	1.54	0.91	0.84	0.78	0.72	0.96
Mean	1.60	1.08	0.82	0.74	0.77	1.00	1.91	1.28	1.03	0.86	0.95	1.21
N	33	33	33	33	33	33	63	63	63	63	63	63
	Sector Markets ETFs						Medium Cap ETFs					
Mon	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Jan	1.40	1.91	1.07	1.00	1.01	0.88	0.94	1.27	0.68	0.98	0.81	0.94
Feb	1.54	1.37	0.94	0.95	0.89	0.86	1.15	0.99	0.84	0.92	0.73	0.92
Mar	1.46	1.80	1.25	0.95	0.87	0.91	1.07	1.39	1.09	0.91	0.84	1.06
Apr	1.52	1.41	1.33	1.11	0.91	1.05	1.08	1.06	1.28	0.99	0.86	1.05
May	1.79	1.33	1.20	0.88	1.11	1.08	1.28	1.11	1.20	0.80	1.15	1.11
Jun	1.77	1.34	0.97	0.71	1.37	0.97	1.32	1.20	0.90	0.67	1.44	1.11
Jul	3.19	1.21	1.04	0.82	1.20	1.27	2.44	0.96	1.02	0.75	1.23	1.28
Aug	2.33	0.99	1.12	0.90	0.84	1.07	1.92	0.88	1.11	0.97	0.78	1.13
Sep	2.15	1.19	0.95	0.84	0.94	0.98	1.62	0.98	0.74	0.76	0.75	0.97
Oct	2.81	1.01	1.08	1.24	0.80	1.23	2.01	0.87	0.83	1.29	0.69	1.14
Nov	2.06	1.01	0.97	0.86	0.93	0.98	1.40	0.98	0.86	0.77	0.94	0.99
Dec	1.43	0.88	0.87	0.73	0.71	0.79	1.04	0.81	0.79	0.66	0.63	0.79
Mean	1.95	1.29	1.07	0.92	0.96	1.01	1.44	1.04	0.94	0.87	0.90	1.04
N	24	24	24	24	24	24	12	12	12	12	12	12
	International Markets ETFs						Small Cap ETFs					
Mon	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Jan	1.52	1.83	1.35	1.07	1.34	1.42	1.22	1.33	0.84	1.10	0.78	1.05
Feb	1.43	1.54	1.21	0.81	0.98	1.20	1.31	1.13	1.16	0.95	0.79	1.07
Mar	1.42	2.03	1.57	0.99	1.05	1.41	1.05	1.38	1.29	0.75	0.83	1.06
Apr	1.41	1.50	1.25	1.18	0.99	1.27	1.12	0.98	1.15	1.24	0.92	1.08
May	1.24	1.38	1.85	0.94	1.60	1.40	1.36	1.09	1.26	0.90	1.21	1.17
Jun	1.82	1.25	1.43	0.85	1.99	1.47	1.41	1.14	0.98	0.76	1.65	1.19
Jul	2.85	1.40	1.16	0.92	1.49	1.56	2.55	1.17	1.14	0.92	1.51	1.46
Aug	2.31	1.05	0.98	1.12	0.86	1.26	1.99	1.04	1.18	0.90	0.97	1.22
Sep	2.14	1.26	1.02	0.92	1.03	1.28	1.97	1.30	0.89	0.78	0.97	1.18
Oct	2.62	1.18	0.97	1.27	0.84	1.38	2.26	1.08	1.04	1.39	0.89	1.33
Nov	1.86	1.16	0.95	0.83	0.86	1.13	1.67	1.14	0.72	0.82	0.94	1.06
Dec	1.62	1.09	1.00	0.99	0.89	1.12	1.17	1.14	0.88	0.80	0.75	0.95
Mean	1.85	1.39	1.23	0.99	1.16	1.32	1.59	1.16	1.04	0.94	1.02	1.15
N	26	26	26	26	26	26	8	8	8	8	8	8

Table 5: T-tests on the Risk Differences between November and the other Months

This table reports the t-statistics that assess the statistical significance of the risk differences between November and other month risks. t-tests are presented for the broad, sector and international ETFs and for the risk of large, medium and large cap ETFs within the period 2002-2006. N represents the number of ETFs within each category.

	<i>Market Categories</i>						<i>Capitalization's Classes</i>					
	Broad Markets ETFs						Large Cap ETFs					
	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Mon	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st
Jan	19.39 ^a	-10.73 ^a	-5.18 ^a	-11.56 ^a	-1.9 ^c	-5.80 ^a	2.55 ^b	-16.2 ^a	-6.21 ^a	-5.75 ^a	-8.9	-10.53 ^a
Feb	10.44 ^a	-5.92 ^a	-3.41 ^a	-10.00 ^a	1.50	-5.17 ^a	1.97 ^c	-8.88 ^a	-3.19 ^a	-2.35 ^b	-2.8	-3.70 ^a
Mar	22.29 ^a	-11.90 ^a	-19.46 ^a	-4.21 ^a	4.2 ^a	-7.82 ^a	3.27 ^a	-14.3 ^a	-11.78 ^a	-5.41 ^a	-1.9 ^c	-12.02 ^a
Apr	17.58 ^a	-4.61 ^a	-9.95 ^a	-24.53 ^a	-0.31	-8.05 ^a	2.88 ^a	-10.9 ^a	-7.39 ^a	-11.49 ^a	-3.2	-7.40 ^a
May	3.46 ^a	-5.30 ^a	-9.47 ^a	-6.91 ^a	-16. ^a	-13.01 ^a	0.84	-10.3 ^a	-7.86 ^a	-4.68 ^a	-9.7	-8.14 ^a
Jun	3.88 ^a	-6.82 ^a	-4.60 ^a	-0.61 ^a	-22. ^a	-20.80 ^a	-2.16 ^b	-6.41 ^a	-5.00 ^a	0.62	-13. ^a	-9.53 ^a
Jul	-25.13 ^a	-4.11 ^a	-4.71 ^a	-3.76 ^a	-19 ^a	-29.71 ^a	-17.91 ^a	-6.57 ^a	-3.14 ^a	-1.69 ^c	-12. ^a	-27.39 ^a
Aug	-16.43 ^a	2.30 ^b	-11.44 ^a	-4.91 ^a	2.1 ^b	-19.68 ^a	-9.39 ^a	1.21	-3.87 ^a	-4.68 ^a	0.96	-8.62 ^a
Sep	-5.78 ^a	-10.52	-2.05 ^b	-2.88 ^a	1.15	-8.94 ^a	-7.71 ^a	-5.75 ^a	-1.60	-3.20 ^a	-3.5 ^a	-8.50 ^a
Oct	-13.52 ^a	1.92 ^c	-9.03 ^a	-21.89 ^a	6.2 ^a	-19.20 ^a	-10.03 ^a	-0.73	-4.45 ^a	-9.65 ^a	2.1 ^b	-13.07 ^a
Dec	12.00 ^a	3.99 ^a	-1.12	-0.37	9.3 ^a	9.11 ^a	1.76 ^c	2.67 ^a	0.37	-1.50	1.95 ^a	5.53 ^a
N	33	33	33	33	33	33	63	63	63	63	63	63
	Sector Markets ETFs						Medium Cap ETFs					
	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Mon	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st
Jan	7.62 ^a	-7.89 ^a	-0.93	-2.08 ^b	-1.4	-2.23 ^b	12.50 ^a	-4.01 ^a	1.72	-11.80 ^a	1.82 ^c	1.12
Feb	6.43 ^a	-4.28 ^a	0.28	-1.40	0.75	0.85	3.11 ^a	-0.10	0.27	-3.45 ^a	2.61 ^b	1.41
Mar	8.22 ^a	-8.34 ^a	-3.20 ^a	-2.54 ^b	1.9 ^c	-3.48 ^a	4.12 ^a	-4.58 ^a	-1.98 ^c	-5.16 ^a	3.49 ^a	-3.47 ^a
Apr	4.48 ^a	-5.53 ^a	-4.25 ^a	-3.66 ^a	0.67	-3.42 ^a	3.33 ^a	-2.42 ^b	-5.54 ^a	-2.13 ^c	2.27 ^b	-8.76 ^a
May	1.88 ^c	-9.99 ^a	-5.71 ^a	-0.48	-3.8 ^a	-3.89 ^a	0.67	-8.00 ^a	-7.03 ^a	-0.41	-2.2 ^b	-3.05 ^b
Jun	2.52 ^b	-6.90 ^a	-0.12	3.11 ^a	-5.5 ^a	-2.02 ^c	0.60	-2.91 ^b	-0.77	2.01 ^c	-3.0 ^b	-1.71
Jul	-10.12 ^a	-3.33 ^a	-0.75	1.09	-4.6 ^a	-11.23 ^a	-8.53 ^a	0.55	-1.73	0.76	-2.9 ^b	-6.66 ^a
Aug	-2.43 ^b	0.40	-1.96 ^c	-0.76	1.44	-3.07 ^a	-6.28 ^a	3.60 ^a	-2.69 ^b	-5.99 ^a	2.35 ^b	-3.52 ^a
Sep	-1.02 ^a	-4.05 ^a	0.15	0.72	-0.12	-1.71 ^c	-2.05 ^c	0.05	2.17 ^b	0.30	2.19 ^c	0.46
Oct	-7.41 ^a	0.22	-1.61	-6.73 ^a	2.2 ^b	-6.58 ^a	-7.73 ^a	2.94 ^b	0.41	-14.50	2.65 ^b	-3.48 ^a
Dec	9.36 ^a	2.56 ^b	2.62 ^b	3.74 ^a	4.8 ^a	12.50 ^a	4.39 ^a	2.52 ^b	1.54	2.40 ^b	5.55 ^a	5.81 ^a
N	24	24	24	24	24	24	12	12	12	12	12	12
	International Markets ETFs						Small Cap ETFs					
	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Mon	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st
Jan	3.88 ^a	-7.04 ^a	-6.57 ^a	-5.61 ^a	-8.2 ^a	-8.47 ^a	8.22	-2.08 ^c	-2.68 ^b	-9.87 ^a	4.87 ^a	0.58
Feb	4.27 ^a	-3.51 ^a	-5.99 ^a	0.67	-2.1 ^b	-2.57 ^b	5.06	0.18	-11.91 ^a	-4.53 ^a	6.53 ^a	-0.79
Mar	3.77 ^a	-5.94 ^a	-10.09 ^a	-3.37 ^a	-3.2 ^a	-11.22 ^a	15.85	-3.23 ^b	-12.87 ^a	1.02	4.25 ^a	-0.42
Apr	4.83 ^a	-4.83 ^a	-6.31 ^a	-5.62 ^a	-3.7 ^a	-4.31 ^a	11.27	2.63 ^b	-9.78 ^a	-11.11 ^a	0.61	-1.43
May	5.60 ^a	-3.80 ^a	-8.98 ^a	-2.90 ^a	-9.8 ^a	-5.95 ^a	6.85	0.81	-18.96 ^a	-5.84 ^a	-8.3 ^a	-7.41 ^a
Jun	0.41	-1.36	-7.45 ^a	-0.39	-13 ^a	-9.50 ^a	3.95	0.03	-4.55 ^a	0.92	-28. ^a	-9.46 ^a
Jul	-9.56 ^a	-3.23 ^a	-4.97 ^a	-2.12 ^b	-9.0 ^a	-17.04 ^a	-13.21	-1.30	-7.67 ^a	-4.04 ^a	-19. ^a	-21.13 ^a
Aug	-5.78 ^a	1.55	-0.97	-6.56 ^a	0.04	-4.73 ^a	-7.17	2.99 ^b	-16.55 ^a	-2.69 ^b	-1.8	-12.86 ^a
Sep	-3.58 ^a	-1.56	-1.75 ^c	-2.59 ^b	-3.5 ^a	-5.24 ^a	-8.73	-9.51	-3.68 ^a	-0.07	-1.54	-11.63 ^a
Oct	-7.15 ^a	-0.39	-0.51	-4.99 ^a	0.41	-6.05 ^a	-8.30	1.56	-6.72 ^a	-25.67 ^a	2.59 ^b	-11.70 ^a
Dec	3.33 ^a	0.99	-1.12	-2.75 ^b	-0.53	0.37	5.55	0.09	-2.12 ^c	-0.40	12.9 ^a	3.00 ^b
N	26	26	26	26	26	26	8	8	8	8	8	8

^a Significant at 0.01% level, ^b Significant at 0.05% level, ^c Significant at 0.10% level

Table 6: Regression Results in ETF Risk's Seasonality

This table reports the coefficients of a pool regression model, which evaluates the statistical significance of the differences in risks of ETFs among November and other months. The dependent variable of the model is the monthly risk of ETFs in pool shape and the independent variables are dummy variables, which take the value one or zero according to the month of reference.

	<i>Market Categories</i>					
	Broad Markets ETFs		Sector Markets ETFs		International Markets ETFs	
Month	Coefficients	T-stat	Coefficients	T-stat	Coefficients	T-stat
Nov	0.89	27.18 ^a	1.17	18.73 ^a	1.13	25.25 ^a
Jan	0.10	2.69 ^a	0.11	1.40	0.29	5.02 ^a
Feb	0.05	1.46	-0.03	-0.40	0.06	1.14
Mar	0.13	2.98 ^a	0.10	1.29	0.28	4.17 ^a
Apr	0.09	2.61 ^a	0.09	1.27	0.13	2.49 ^b
May	0.13	3.80 ^a	0.10	1.31	0.27	4.05 ^a
Jun	0.14	4.06 ^a	0.07	0.98	0.33	5.30 ^a
Jul	0.38	7.13 ^a	0.32	3.76 ^a	0.43	6.40 ^a
Aug	0.16	4.39 ^a	0.07	1.14	0.13	2.56 ^b
Sep	0.10	3.56 ^a	0.05	0.99	0.14	3.54 ^a
Oct	0.25	7.81 ^a	0.22	4.10 ^a	0.25	4.96 ^a
Dec	-0.12	-5.77 ^a	-0.24	-6.45 ^a	-0.01	-0.38
F-Stat	11.70 ^a		4.59 ^a		6.79 ^a	
	<i>Capitalization's Classes</i>					
	Large Cap ETFs		Medium Cap ETFs		Small Cap ETFs	
Month	Coefficients	T-stat	Coefficients	T-stat	Coefficients	T-stat
Nov	1.05	31.52 ^a	0.99	20.11 ^a	1.06	17.56 ^a
Jan	0.22	5.57 ^a	-0.05	-0.81	-0.01	-0.09
Feb	0.05	1.45	-0.07	-1.05	0.01	0.15
Mar	0.21	4.88 ^a	0.07	1.11	0.00	0.05
Apr	0.12	3.46 ^a	0.06	0.96	0.11	1.54
May	0.18	4.71 ^a	0.12	1.57	0.02	0.36
Jun	0.20	5.51 ^a	0.12	1.44	0.13	1.65 ^c
Jul	0.39	9.17 ^a	0.29	3.29 ^a	0.40	4.06 ^a
Aug	0.12	3.57 ^a	0.14	2.18 ^b	0.16	2.28 ^b
Sep	0.12	4.47 ^a	-0.02	-0.37	0.12	2.11 ^b
Oct	0.25	8.46 ^a	0.15	2.48 ^b	0.27	4.46 ^a
Dec	-0.11	-5.03 ^a	-0.20	-5.75 ^a	-0.11	-2.31 ^b
F-Stat	12.86 ^a		4.63 ^a		5.52 ^a	

^a Significant at 0.01% level, ^b Significant at 0.05% level, ^c Significant at 0.10% level

Table 7: Monthly Tracking Error of ETFs

This table reports the average tracking error of broad, sector and international ETFs and of the large, medium and large cap ETFs for each calendar month in standard deviation terms of return differences among ETFs and indexes within the period 2002-2006. Table also presents the mean monthly tracking error within each year and the mean tracking error within each single month. N represents the number of ETFs within each category.

	<i>Market Categories</i>						<i>Capitalization's Classes</i>					
	Broad Markets ETFs						Large Cap ETFs					
Mon	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Jan	0.39	0.41	0.25	0.21	0.20	0.29	0.78	0.78	0.64	0.44	0.44	0.62
Feb	0.38	0.47	0.21	0.17	0.19	0.28	0.89	0.85	0.49	0.38	0.39	0.60
Mar	0.31	0.42	0.28	0.24	0.19	0.29	0.66	0.90	0.66	0.43	0.40	0.61
Apr	0.34	0.36	0.26	0.24	0.21	0.28	0.72	0.69	0.56	0.54	0.37	0.57
May	0.34	0.31	0.28	0.23	0.24	0.28	0.73	0.63	0.67	0.40	0.52	0.59
Jun	0.51	0.29	0.24	0.21	0.27	0.31	0.97	0.66	0.53	0.36	0.71	0.65
Jul	0.79	0.32	0.26	0.20	0.22	0.36	1.93	0.70	0.55	0.40	0.58	0.83
Aug	0.56	0.30	0.25	0.21	0.16	0.29	1.37	0.56	0.50	0.40	0.37	0.64
Sep	0.65	0.27	0.24	0.22	0.17	0.31	1.32	0.59	0.41	0.37	0.36	0.61
Oct	0.88	0.30	0.22	0.24	0.15	0.36	1.64	0.54	0.46	0.53	0.33	0.70
Nov	0.46	0.29	0.19	0.22	0.15	0.26	1.04	0.52	0.41	0.33	0.35	0.53
Dec	0.43	0.26	0.27	0.25	0.18	0.28	1.02	0.56	0.49	0.43	0.42	0.58
Mean	0.50	0.33	0.25	0.22	0.19	0.30	1.09	0.67	0.53	0.42	0.44	0.63
N	33	33	33	33	33	33	63	63	63	63	63	63
	Sector Markets ETFs						Medium Cap ETFs					
Mon	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Jan	0.62	0.58	0.36	0.30	0.29	0.43	0.38	0.38	0.23	0.24	0.22	0.29
Feb	0.69	0.68	0.30	0.24	0.19	0.42	0.44	0.38	0.25	0.18	0.21	0.29
Mar	0.59	0.64	0.41	0.27	0.20	0.42	0.39	0.38	0.29	0.30	0.24	0.32
Apr	0.50	0.49	0.36	0.27	0.19	0.36	0.31	0.36	0.26	0.32	0.21	0.29
May	0.56	0.47	0.35	0.24	0.21	0.37	0.33	0.38	0.31	0.23	0.30	0.31
Jun	0.64	0.44	0.35	0.22	0.25	0.38	0.43	0.35	0.32	0.24	0.39	0.35
Jul	1.64	0.48	0.30	0.22	0.25	0.58	0.81	0.29	0.26	0.26	0.24	0.37
Aug	0.91	0.41	0.27	0.24	0.18	0.40	0.50	0.31	0.24	0.24	0.20	0.30
Sep	0.84	0.41	0.24	0.22	0.21	0.38	0.53	0.29	0.26	0.28	0.20	0.31
Oct	0.99	0.37	0.24	0.22	0.18	0.40	0.80	0.28	0.25	0.28	0.18	0.36
Nov	0.59	0.34	0.25	0.20	0.20	0.32	0.37	0.26	0.19	0.25	0.19	0.25
Dec	0.58	0.34	0.29	0.24	0.23	0.34	0.48	0.27	0.27	0.26	0.26	0.31
Mean	0.76	0.47	0.31	0.24	0.22	0.40	0.48	0.33	0.26	0.26	0.24	0.31
N	24	24	24	24	24	24	12	12	12	12	12	12
	International Markets ETFs						Small Cap ETFs					
Mon	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Jan	1.05	1.15	1.10	0.72	0.74	0.95	0.36	0.47	0.30	0.26	0.26	0.33
Feb	1.09	1.15	0.85	0.63	0.69	0.88	0.34	0.47	0.25	0.18	0.21	0.29
Mar	0.88	1.36	1.09	0.70	0.71	0.95	0.30	0.43	0.31	0.22	0.19	0.29
Apr	1.01	1.04	0.89	0.97	0.64	0.91	0.29	0.36	0.27	0.26	0.28	0.29
May	0.98	0.96	1.18	0.65	0.99	0.95	0.33	0.31	0.32	0.32	0.29	0.31
Jun	1.31	1.09	0.89	0.59	1.46	1.07	0.40	0.33	0.29	0.25	0.41	0.33
Jul	2.24	1.08	0.94	0.71	1.09	1.21	0.88	0.31	0.28	0.24	0.26	0.39
Aug	1.78	0.86	0.85	0.66	0.70	0.97	0.51	0.33	0.32	0.25	0.19	0.32
Sep	1.67	0.93	0.69	0.63	0.62	0.91	0.69	0.25	0.30	0.21	0.16	0.32
Oct	2.00	0.83	0.80	1.00	0.58	1.04	0.93	0.33	0.26	0.28	0.18	0.40
Nov	1.36	0.80	0.66	0.54	0.63	0.80	0.53	0.29	0.21	0.27	0.21	0.31
Dec	1.28	0.95	0.80	0.72	0.76	0.90	0.45	0.33	0.34	0.34	0.21	0.33
Mean	1.39	1.02	0.89	0.71	0.80	0.96	0.50	0.35	0.29	0.26	0.24	0.33
N	26	26	26	26	26	26	8	8	8	8	8	8

Table 8: T-tests on the Tracking Error Differences between November and the other Months

This table reports the t-tests which count for the statistical significance of the differences in tracking error between November and the other months. t-tests are presented for the broad, sector and international ETFs and for the tracking error of large, medium and large cap ETFs within the period 2002-2006. N represents the number of ETFs within each category.

	<i>Market Categories</i>						<i>Capitalization's Classes</i>					
	Broad Markets ETFs						Large Cap ETFs					
	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Mon	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st
Jan	1.93 ^c	-2.80	-3.09 ^a	0.56	-5.5 ^a	-2.95 ^a	2.66 ^a	-5.88 ^a	-5.11 ^a	-5.76 ^a	-3.5 ^a	-6.99 ^a
Feb	1.81 ^c	-3.02	-1.06	3.41 ^a	-2.4 ^b	-1.74 ^c	2.32 ^b	-6.22 ^a	-2.61 ^b	-2.86 ^a	-2.5 ^a	-5.98 ^a
Mar	4.40 ^a	-3.09	-4.00 ^a	-1.21	-3.9 ^a	-2.04 ^b	5.02	-7.53 ^a	-6.58 ^a	-6.54 ^a	-3.0 ^a	-7.69 ^a
Apr	2.62 ^b	-1.71 ^c	-3.93 ^a	-0.84	-4.1 ^a	-1.60	5.09 ^a	-4.69 ^a	-6.36 ^a	-6.90 ^a	-1.26	-5.51 ^a
May	3.60 ^a	-0.36	-5.02 ^a	-0.51	-6.5 ^a	-1.52	5.23 ^a	-2.82 ^a	-6.54 ^a	-4.36 ^a	-5.6 ^a	-5.56 ^a
Jun	-1.22	-0.06	-3.08 ^a	0.57	-3.8 ^a	-3.42 ^a	-1.09	-3.61 ^a	-5.91 ^a	-2.22 ^b	-6.5 ^a	-7.99 ^a
Jul	-5.15 ^a	-0.81	-4.93 ^a	1.18	-5.0 ^a	-4.61 ^a	-10.17 ^a	-4.98 ^a	-6.14 ^a	-3.03 ^a	-5.8 ^a	-11.67 ^a
Aug	-2.34 ^b	-0.22	-3.96 ^a	0.66	-0.72	-2.53 ^b	-6.56 ^a	-1.25	-5.33 ^a	-4.39 ^a	-1.1	-7.22 ^a
Sep	-3.67 ^a	0.47	-2.96 ^a	0.37	-1.44	-3.42 ^a	-6.77 ^a	-2.18 ^b	-0.24	-3.54 ^a	-0.79	-6.91 ^a
Oct	-4.28 ^a	-0.30	-1.45	-1.09	0.03	-4.10 ^a	-6.72 ^a	-0.78	-2.35 ^b	-5.95 ^a	1.80 ^c	-7.06 ^a
Dec	0.81	0.74	-2.38 ^b	-0.76	-3.1 ^a	-1.01	1.69 ^c	-1.11	-3.87 ^a	-4.22 ^a	-3.2 ^a	-2.63 ^b
N	33	33	33	33	33	33	63	63	63	63	63	63
	Sector Markets ETFs						Medium Cap ETFs					
	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Mon	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st
Jan	-0.23	-4.56	-1.96 ^c	-3.48	-2.2 ^b	-4.54 ^a	-0.43	-7.38	-2.09 ^c	0.44	-1.07	-2.92 ^b
Feb	-1.63	-4.53	-1.17	-2.16 ^b	0.33	-4.84 ^a	-1.69	-2.44 ^b	-6.17 ^a	2.44 ^b	-1.58	-2.23 ^b
Mar	0.00	-5.50	-3.08 ^a	-4.30	-0.17	-4.49 ^a	-0.65	-4.46	-4.98 ^a	-1.59	-2.4 ^b	-3.43 ^a
Apr	1.47	-4.20	-3.15 ^c	-3.55	0.87	-2.53 ^b	1.02	-4.65	-4.55 ^a	-1.20	-1.17	-4.03 ^a
May	0.79	-3.82	-5.66 ^c	-2.23 ^b	-0.72	-4.41 ^a	1.26	-2.39 ^b	-3.61 ^a	1.07	-3.7 ^a	-4.70 ^a
Jun	-1.03	-4.11	-4.72 ^c	-1.39	-2.9 ^a	-5.03 ^a	-1.49	-2.44	-3.60 ^a	0.59	-1.52	-3.14 ^a
Jul	-8.49	-3.88	-2.31 ^b	-1.39	-1.8 ^c	-10.83 ^a	-4.56 ^a	-1.04	-3.12 ^a	-0.45	-1.76	-4.32 ^a
Aug	-4.68	-2.86	-1.04	-2.84	1.39	-5.58 ^a	-2.94 ^b	-4.55	-1.74 ^a	0.30	-0.67	-3.93 ^a
Sep	-4.62	-2.48 ^b	0.79	-1.05	-0.77	-4.70 ^a	-4.42 ^a	-1.03	-3.50 ^a	-0.94	-0.44	-3.30 ^a
Oct	-3.10	-2.11 ^b	0.66	-1.59	1.08	-3.25 ^a	-3.54 ^a	-0.85	-1.49	-0.78	0.49	-3.77 ^a
Dec	0.18	0.09	-1.89 ^c	-2.03 ^c	-1.43	-0.91	-2.93 ^b	-0.59	-3.28 ^a	0.22	-2.9 ^b	-2.27 ^b
N	24	24	24	24	24	24	12	12	12	12	12	12
	International Markets ETFs						Small Cap ETFs					
	2002	2003	2004	2005	2006	Mean	2002	2003	2004	2005	2006	Mean
Mon	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st	T-st
Jan	4.52 ^a	-4.64 ^a	-5.25 ^a	-5.62 ^a	-2.0 ^c	-6.01 ^a	1.58	-1.93 ^c	-2.06 ^c	0.35	-2.2 ^c	-2.52 ^b
Feb	3.67 ^a	-4.25 ^a	-2.78 ^b	-2.65 ^b	-2.1 ^b	-6.12 ^a	1.73	-1.86	-1.32	2.21	-0.08	0.78
Mar	6.92 ^a	-6.77 ^a	-6.90 ^a	-5.46 ^a	-2.2 ^b	-6.42 ^a	2.02 ^c	-4.11	-2.57 ^b	1.31	0.92	0.57
Apr	6.08 ^a	-4.31 ^a	-5.60 ^a	-10.67 ^a	-0.57	-6.47 ^a	2.02 ^c	-4.06	-1.90 ^c	0.26	-1.59	0.52
May	6.20 ^a	-2.73 ^b	-7.45 ^a	-3.94 ^a	-7.1 ^a	-6.06 ^a	2.38 ^b	-0.38	-2.34 ^c	-1.33	-2.3 ^c	-0.35
Jun	1.33	-4.39 ^a	-5.78 ^a	-1.84 ^c	-9.7 ^a	-8.64 ^a	1.22	-1.91 ^c	-1.86	0.75	-1.60	-0.99
Jul	-7.55	-5.10 ^a	-6.27 ^a	-3.76 ^a	-6.4 ^a	-9.75 ^a	-2.24 ^c	-0.82	-1.41	0.65	-1.64	-1.89
Aug	-4.77 ^a	-0.99	-6.15 ^a	-4.34 ^a	-1.46	-7.96 ^a	0.32	-0.82	-2.72 ^b	0.48	1.19	-0.60
Sep	-4.88 ^a	-2.39 ^b	-0.68	-4.29 ^a	0.05	-5.87 ^a	-1.52	2.37 ^b	-2.56 ^b	1.87	1.72	-0.78
Oct	-6.81 ^a	-0.60	-3.18 ^a	-10.00 ^a	2.07 ^b	-6.90 ^a	-2.13 ^c	-1.10	-1.04	-0.23	2.12 ^c	-2.37 ^b
Dec	1.24	-2.79 ^b	-3.75 ^a	-4.14 ^a	-2.9 ^a	-7.56 ^a	1.33	-0.52	-1.27	-0.49	0.07	-0.55
N	26	26	26	26	26	26	8	8	8	8	8	8

^a Significant at 0.01% level, ^b Significant at 0.05% level, ^c Significant at 0.10% level

Table 9: Regression Results in ETF Tracking Error's Seasonality

This table reports the coefficients of a pool regression model, which evaluates the statistical significance of the differences in tracking errors of ETFs between November and the other months. The dependent variable of the model is the monthly tracking error of ETFs in pool shape and the independent variables are dummy variables, which take the value one or zero according to the month of reference.

	<i>Market Categories</i>					
	Broad Markets ETFs		Sector Markets ETFs		International Markets ETFs	
Month	Coefficients	T-stat	Coefficients	T-stat	Coefficients	T-stat
Nov	0.26	16.15 ^a	0.32	13.70 ^a	0.80	23.10 ^a
Jan	0.03	1.66 ^c	0.11	3.15 ^a	0.16	3.29 ^a
Feb	0.02	0.98	0.10	3.03 ^a	0.08	1.95 ^c
Mar	0.03	1.39	0.10	3.03 ^a	0.15	2.96 ^a
Apr	0.02	1.03	0.04	1.50	0.11	2.66 ^a
May	0.02	0.95	0.05	1.82 ^c	0.16	3.36 ^a
Jun	0.04	2.22 ^b	0.06	2.48 ^b	0.27	5.67 ^a
Jul	0.10	3.61 ^a	0.26	4.80 ^a	0.41	7.27 ^a
Aug	0.03	1.80 ^c	0.08	2.69 ^a	0.17	4.17 ^a
Sep	0.05	2.48 ^b	0.06	2.59 ^a	0.11	3.21 ^a
Oct	0.10	3.64 ^a	0.09	2.55 ^a	0.24	6.17 ^a
Dec	0.02	1.05	0.02	1.18	0.11	3.93 ^a
F-Stat	2.49 ^a		3.66 ^a		6.43 ^a	
	<i>Capitalization's Classes</i>					
	Large Cap ETFs		Medium Cap ETFs		Small Cap ETFs	
Month	Coefficients	T-stat	Coefficients	T-stat	Coefficients	T-stat
Nov	0.50	22.16 ^a	0.25	7.82 ^a	0.31	8.23 ^a
Jan	0.11	3.26 ^a	0.04	0.83	0.02	0.46
Feb	0.08	2.37 ^b	0.04	0.90	-0.01	-0.26
Mar	0.11	3.04 ^a	0.07	1.52	-0.02	-0.29
Apr	0.07	2.10 ^b	0.04	0.95	0.01	0.16
May	0.08	2.38 ^a	0.06	1.24	-0.01	-0.24
Jun	0.14	3.79 ^a	0.09	2.08 ^b	0.03	0.56
Jul	0.29	6.18 ^a	0.12	2.67 ^a	0.09	1.70 ^c
Aug	0.11	2.87 ^a	0.05	1.07	0.02	0.30
Sep	0.08	2.21 ^b	0.06	1.35	0.02	0.31
Oct	0.15	3.51 ^a	0.11	2.32 ^b	0.09	1.74 ^c
Dec	0.05	1.42	0.06	1.27	0.03	0.55
F-Stat	6.15 ^a		1.05		0.92	

^a Significant at 0.01% level, ^b Significant at 0.05% level, ^c Significant at 0.10% level

Table10: Comparison of Investing Strategies

This table presents an ex-post comparison in returns and risks of various theoretically implemented investing strategies. The first three strategies concern the investing in Broad, Sector or International Markets ETFs respectively only during November of each year. November returns and risks are considered in annualized terms by multiplying the mean monthly return and risk by 12 and by the square root of 12, respectively. The fourth strategy considers the investing in the average market portfolio at the beginning of each year and the sustention of this portfolio until the end of the year (Buy and Hold 1). The fifth strategy assumes the investing in a portfolio including ETFs that receive four and five stars rating by Morningstar, irrespectively of the market or capitalization, at the beginning of each year and the sustention of this portfolio until the end of the year (Buy and Hold 2). The table presents the returns and risks in annualized terms.

<i>Market Categories</i>										
Year	Broad ETFs		Sector ETFs		International ETFs		Buy and Hold 1		Buy and Hold 2	
	Novem	Novem	Novem	Novem	Novem	Novem	Annual	Annual	Annual	Annual
	Return	Risk	Return	Risk	Return	Risk	Return	Risk	Return	Risk
2002	4.08	5.58	5.52	7.14	3.12	6.44	-3.24	21.62	-2.04	17.63
2003	1.44	3.05	1.20	3.50	1.44	4.02	5.52	15.03	5.04	12.37
2004	3.24	2.25	2.88	3.36	4.08	3.29	2.64	12.47	2.88	10.81
2005	2.52	2.08	2.04	2.98	1.68	2.88	1.80	10.57	1.68	9.60
2006	1.44	2.39	1.80	3.22	2.64	2.98	3.00	11.57	2.88	10.32
Mean	2.54	3.07	2.69	4.04	2.59	3.92	1.94	14.25	2.09	12.15
Accum	12.72	15.35	13.44	20.20	12.96	19.61	9.72	71.26	10.44	60.73
<i>Capitalization's Classes</i>										
Year	Large ETFs		Medium ETFs		Small ETFs		Buy and Hold 1		Buy and Hold 2	
	Novem	Novem	Novem	Novem	Novem	Novem	Annual	Annual	Annual	Annual
	Return	Risk	Return	Risk	Return	Risk	Return	Risk	Return	Risk
2002	3.48	6.72	3.60	4.85	4.44	5.79	-2.64	19.75	-2.04	17.63
2003	1.08	3.46	2.16	3.39	2.40	3.95	5.52	13.93	5.04	12.37
2004	3.24	2.94	3.36	2.98	4.68	2.49	2.88	12.06	2.88	10.81
2005	1.92	2.53	2.64	2.67	3.00	2.84	1.44	10.67	1.68	9.60
2006	1.92	2.67	2.16	3.26	1.68	3.26	2.76	11.47	2.88	10.32
Mean	2.33	3.67	2.78	3.43	3.24	3.67	1.99	13.57	2.09	12.15
Accum	11.64	18.33	13.92	17.15	16.20	18.33	9.96	67.86	10.44	60.73