Measuring weak-form market efficiency

ASSIGN BUSTER

Contents

Measuring Weak-form Market Efficiency

Abstraction

This paper tests weak-form efficiency in the U. S. market. Both day-to-day and monthly returns are employed for autocorrelation analysis, discrepancy ratio trials and hold trials. Three decisions are reached. First, security returns are predictable to some extent. While single stock returns are decrepit negatively correlated and hard to foretell, market-wide indices with outstanding recent public presentation show a positive autocorrelation and offer more predictable net income chances. Second, monthly returns follow random walk better than day-to-day returns and are therefore more weak-form efficient. Finally, weak-form inefficiency is non needfully bad. Investors should be rewarded a certain grade of predictability for bearing hazards.

Efficient market hypothesis (EMH) , besides known as “ information efficiency ” , refers to the extent to which stock monetary values integrate all available information. The impression is of import in assisting investors to understand security behavior so as to do wise investing determinations. Harmonizing to Fama (1970) , there are three versions of market efficiency: the weak, semistrong, and strong signifier. They differ with regard to the information that is incorporated in the stock monetary values. The weak signifier efficiency assumes that stock monetary values already incorporate all past trading information. Therefore, proficient analysis on past stock monetary values will non be helpful in deriving unnatural returns. The semistrong signifier efficiency extends the information set to all publically

available information including non merely past trading information but besides cardinal informations on house chances. Therefore, neither proficient analysis nor cardinal analysis will be able to bring forth unnatural returns. Strong signifier efficiency differs from the above two in saying that stock monetary values non merely reflect publically available information but besides private inside information. However, this signifier of market efficiency is ever rejected by empirical grounds.

If weak-form efficiency holds true, the information contained in past stock monetary value will be wholly and immediately reflected in the current monetary value. Under such status, no form can be observed in stock monetary values. In other words, stock monetary values tend to follow a random walk theoretical account. Therefore, the trial of weak-form market efficiency is really a trial of random walk but non frailty versa. The more efficient the market is, the more random are the stock monetary values, and attempts by fund directors to work past monetary value history will non be profitable since future monetary values are wholly unpredictable. Therefore, mensurating weak-form efficiency is important non merely in academic research but besides in pattern because it affects trading schemes.

This paper chiefly tests the weak-form efficiency for three stocks-Faro Technologies Inc. (FARO) , FEI Company (FEIC) and Fidelity Southern Corporation (LION) and two decile indices-the NYSE/AMEX/NASDAQ Index capitalization based Deciles 1 and 10 (NAN D1 and NAN D10) . Both day-to-day and monthly informations are employed here to observe any misdemeanor of the random walk hypothesis.

The balance of the paper is structured in the undermentioned manner. Section I provides a brief debut of the three houses and two decile indices. Section II describes the information and discusses the methodological analysis used. Section III nowadayss descriptive statistics. Section IV is the consequence based on empirical analysis. Finally, subdivision V concludes the paper.

I. The Companies [1]

A. Faro Technologies Inc (FARO)

FARO Technologies is an instrument company whose rule activities include design and develop portable 3-D electronic systems for industrial applications in the fabrication system. The company ' s chief merchandises include the Faro Arm, Faro Scan Arm and Faro Gage articulated mensurating devices. It chiefly operates in the United States and Europe.

B. FEI Company (FEI)

FEI is a taking scientific instruments company which develops and industries diversified semiconducting material equipments including negatron microscopes and beam systems. It operates in four sections: NanoElectronics, NanoResearch and Industry, NanoBiology and Service and Components. With a 60-year history, it now has about 1800 employees and sells merchandises to more than 50 states around the universe.

C. Fidelity Southern Corp. (LION)

Fidelity Southern Corp. is one of the largest community Bankss in tube Atlanta which provides a broad scope of fiscal services including commercial

and mortgage services to both corporate and personal clients. It besides provides international trade services, trust services, recognition card loans, and merchandiser services. The company provides fiscal merchandises and services for concern and retail clients chiefly through subdivisions and via cyberspace.

D. NYSE/AMEX/NASDAQ Index

It is an index taken from the Center for Research in Security Prices (CRSP) which includes all common stocks listed on the NYSE, Amex, and NASDAQ National Market. The index is constructed by ranking all NYSE companies harmonizing to their market capitalisation in the first topographic point. They are so divided into 10 decile portfolios. Amex and NASDAQ stocks are so placed into the deciles based on NYSE breakpoints. The smallest and the largest houses based on market capitalisation are placed into Decile 1 and Decile 10, severally.

II. Data and Methodology

A. Data

Datas for the three stocks and two decile indices in our survey are all obtained from the Center for Research in Securities Prices database (CRSP) on both day-to-day and monthly footing from January 2000 to December 2005. Tax returns are so computed on both footing, bring forthing a sum of 1507 day-to-day observations and 71 monthly observations. The NYSE/AMEX/NASDAQ Index is CRSP Capitalisation-based so that Decile 1 and 10 represent the smallest and largest houses, severally, based on market capitalization. In add-on, The Standard and Poors 500 Index (S & A ; P 500)

is used as a placeholder for the market index. It is a valued-weighted index which incorporates the largest 500 stocks in US market. For comparing intents, both continuously compounded (log) returns and simple returns are reported, although the analysis is based on the consequence of the first 1.

B. Methods

B. 1. Autocorrelation Trials

One of the most intuitive and simple trials of random walk is to prove for consecutive dependance, i. e. autocorrelation. The autocorrelation is a time-series phenomenon, which implies the consecutive correlativity between certain lagged values in a clip series. The first-order autocorrelation, for case, indicates to what extent neighbouring observations are correlated. The autocorrelation trial is ever used to prove RW3, which is a less restrictive version of random walk theoretical account, leting the being of dependant but uncorrelated increases in return informations. The expression of autocorrelation at slowdown K is given by:

(1) where is the autocorrelation at slowdown ; is the log-return on stock at clip ; and is the log-return on stock at clip. A greater than zero indicates a positive consecutive correlativity whereas a less than zero indicates a negative consecutive correlativity. Both positive and negative autocorrelation represent goings from the random walk theoretical account. If is significantly different from nothing, the void hypothesis of a random walk is rejected.

The autocorrelation coefficients up to 5 slowdowns for day-to-day informations and 3 slowdowns for monthly informations are reported in our trial. Consequences of the Ljung-Box trial for all lags up to the above mentioned for both day-to-day and monthly informations are besides reported. The Ljung-Box trial is a more powerful trial by summing the squared autocorrelations. It provides grounds for whether going for zero autocorrelation is observed at all lags up to certain slowdowns in either way. The Q-statistic up to a certain slowdown m is given by:

(2)

B. 2. Variance Ratio Trials

We follow Lo and MacKinlay ' s (1988) individual discrepancy ratio (VR) trial in our survey. The trial is based on a really of import premise of random walk that discrepancy of increases is a additive map of the clip interval. In other words, if the random walk holds, the discrepancy of the qth differed value should be equal to q times the discrepancy of the first differed value. For illustration, the discrepancy of a two-period return should be equal to twice the discrepancy of the one-period return. Harmonizing to its definition, the expression of discrepancy ratio is denoted by:

(3) where Q is any positive whole number. Under the void hypothesis of a random walk, VR (Q) should be equal to one at all slowdowns. If VR (Q) is greater than one, there is positive consecutive correlativity which indicates a continuity in monetary values, matching to the impulse consequence. If VR (Q) is less than one, there is negative consecutive correlativity which

indicates a reversal in monetary values, matching to the mean-reverting procedure.

Note that the above two trial are besides trials of how stock monetary values respond to publically available information in the yesteryear. If market efficiency holds true, information from past monetary values should be instantly and to the full reflected in the current stock monetary value. Therefore, future stock monetary value alteration conditioned on past monetary values should be equal to zero.

B. 3. Griffin-Kelly-Nardari DELAY Trials

As defined by Griffin, Kelly and Nardari (2007) , “ hold is a step of sensitiveness of current returns to past market-wide information ” . [2] Speaking otherwise, hold measures how rapidly stock returns can respond to market returns. The logic behind this is that a stock which is slow to integrate market information is less efficient than a stock which responds rapidly to market motions.

S & A ; P 500 index is employed in hold trial to analyze the sensitiveness of stock returns to market information. For each stock and decile index, both restricted and unrestricted theoretical accounts are estimated from January 2000 to December 2005. The unrestricted theoretical account is given by:

(4) where is the log-return on stock I at clip T ; is the market log-return (return for S & A ; P 500 index) at clip T ; is the lagged market return ; is the coefficient on the lagged market return ; and is the slowdown which is 1, 2,

3, 4 for the day-to-day informations and 1, 2, 3 for the monthly informations. The restricted theoretical account is as follows which sets all to be zero:

(5) Delay is so calculated based on adjusted R-squares from above arrested developments as follows:

(6) An option scaly step of hold is given by:

(7) Both steps are reported in a manner that the larger the deliberate hold value, the more return fluctuation is explained by lagged market returns and therefore the more delayed response to the market information.

III. Descriptive Statistics

A. Daily frequences

Table I shows the drumhead statistic of day-to-day returns for the three stocks and two decile indices. The highest average return is for FARO (0. 0012) , whereas the lowest average return is for NAN D10 (0. 0000) . In footings of average return, NAN D1 (0. 0015) outperforms all the other stocks. Both the highest maximal return and the lowest minimal return (0. 2998 and -0. 2184, severally) are for FARO, matching to its highest standard divergence (0. 0485) among all, bespeaking that FARO is the most volatile in returns. On the other manus, both the lowest maximal return and highest minimal return (0. 0543 and -0. 0675, severally) are for NAN D10. However NAN D10 is merely the 2nd least volatile, while the lowest standard divergence is for NAN D1 (0. 0108) . Figure 1 and 2 nowadayss the monetary value degree of the most and least volatile index (stock) . All the

above observations remain true if we change from log-return footing to a simple return footing.

In footings of the grade of dissymmetry of the return distributions, all stocks and indices are positively skewed, with the lone exclusion of NAN D1. The positive lopsidedness implies that more utmost values are in the right tail of the distribution, i. e. stocks are more likely to hold times when public presentation is highly good. On the other manus, NAN D1 is somewhat negatively skewed, which means that returns are more likely to be lower that what is expected by normal distribution. In mensurating the “ peakedness ” of return distributions, positive extra kurtosis is observed in all stocks and indices, besides known as a leptokurtic distribution, which means that returns either cluster around the mean or disperse in the two terminals of the distribution. All the above observations can be used to once and for all reject the void hypothesis that day-to-day returns are usually distributed. What ‘ more, consequences from Jarque-Bera trial provide supportive grounds for rejection of the normalcy hypothesis at all important degrees for all stocks and indices.

B. Monthly frequences

Descriptive statistics of monthly returns are similarly presented in Table II. Most of the above decisions reached for day-to-day returns are besides valid in the context of monthly returns. In other words, what is the highest (lowest) value for day-to-day returns is besides the highest (lowest) for monthly returns in most instances. The lone exclusions are for the highest value in average returns and the lowest value and standard divergence in minimal

returns. In this state of affairs, NAN D10 (0. 0460) and FARO (0. 1944) have the least and most scattering harmonizing to their standard divergences, compared with NAN D1 and FARO in day-to-day instance. From above observation, we can see that decile indices are more stable than single stocks in footings of returns. What ‘ s more, monthly returns have larger magnitude in most values than day-to-day returns.

Coming to the measuring of dissymmetry and peakedness of return distributions, merely NAN D10 (-0. 4531) is negatively skewed. However, the grade of lopsidedness is non far from 0. Other stocks and index are all positively skewed with both FEIC (0. 0395) and LION (0. 0320) holding a skewness value really near to 0. Almost all stocks and index have a grade of kurtosis similar to that of normal distribution, except that NAN D1 (8. 6623) is extremely peaked. This is besides consistent with the consequences of JB p-values, based on which we conclude that FEIC, LION and NAN D10 are about normal because we fail to reject the hypothesis that they are usually distributed at 5 % or higher degrees (see Figure 3 and 4 for mention) . However when simple return footing is used, FEIC is no longer usually distributed even at the 1 % important degree. Except this, utilizing simple return produces similar consequences.

IV. Consequences

A. Autocorrelation Trials

A. 1. Trials for Log-Returns

The consequences of autocorrelation trials for up to 5 slowdowns of day-to-day log-returns and up to 3 slowdowns of monthly log-returns for three

stocks and two decile indices from January 2000 to December 2005 are summarised in Table III. Both the autocorrelation (AC) and partial autocorrelation (PAC) are examined in our trials.

As is shown in Panel A, all 5 slowdowns of FARO, FEIC and NAN D10 for both AC and PAC are undistinguished at 5 % degree, except for the fourth-order PAC coefficient of FARO (-0. 052) , which is somewhat negatively important. On the contrary, NAN D1 has important positive AC and PAC at about all slowdowns except in the 4th order, its PAC (0. 050) is hardly within the 5 % significance degree. The important AC and PAC coefficients reject the void hypothesis of no consecutive correlativity in NAN D1, thereby rejecting the weak-form efficiency. In footings of LION, important negative autocorrelation coefficients are merely observed in the first two orders and its higher-order coefficients are non statistically important. Besides that, we find that all the stocks and indices have negative autocorrelation coefficients at most of their slowdowns, with the lone exclusion of NAN D1, whose coefficients are all positive. The purely positive AC and PAC indicates continuity in returns, i. e. a impulse consequence for NAN D1, which means that good or bad public presentations in the past tend to go on over clip.

We besides present the Ljung-Box (L-B) trial statistic in order to see whether autocorrelation coefficients up to a specific slowdown are jointly important. Since RW1 implies all autocorrelations are zero, the L-B trial is more powerful because it tests the joint hypothesis. As is shown in the tabular array, both LION and NAN D1 have important Q values in all slowdowns at all degrees, while none of FARO, FEIC and NAN D10 has important Q values.

Based on above day-to-day observations, we may reason that the void hypothesis of no consecutive correlativity is rejected at all degrees for LION and NAN D1, but the void hypothesis can non be rejected at either 5 % degree or 10 % degree for FARO, FEIC and NAN D10. This means that both LION and NAN D1 are weak-form inefficient. By looking at their past public presentation, we find that while NAN D1 outperformed the market in sample period, LION performed severely in the same period. Therefore, it seems that stocks or indices with best and worst recent public presentation have stronger autocorrelation. In peculiar, LION shows a positive autocorrelation in returns, proposing that market-wide indices with outstanding recent public presentation have momentum in returns over short periods, which offer predictable chances to investors.

When monthly returns are employed, no individual stock or index has important AC or PAC in any slowdown reported at 5 % degree. It is in contrast with day-to-day returns, which means that monthly returns follow a random walk better than day-to-day returns. More powerful L-B trial confirms our decision by demoing that Q statistics for all stocks and indices are statistically undistinguished at either 5 % or 10 % degree. Therefore, the L-B void hypothesis can be once and for all rejected for all stocks and indices up to 3 slowdowns. When compared with day-to-day returns, monthly returns seem to follow random walk better and are therefore more weak-form efficient.

A. 2. Trials for Squared Log-Returns

Even when returns are non correlated, their volatility may be correlated. Therefore, it is necessary for us to spread out the survey from returns to discrepancies of returns. Squared log-returns and absolute value of log-returns are steps of discrepancies and are therefore utile in analyzing the consecutive dependance of return volatility. The consequences of autocorrelation analysis for day-to-day squared log-returns for all three stocks and two decile indices are similarly reported in Table IV.

In contrast to the consequences for log-returns, coefficients for FEIC, LION, NAN D1 and NAN D10 are significantly different from zero, except for the forth-order PAC coefficient (0. 025) for FEIC, the fifth-order PAC coefficient for LION (-0. 047) and third- and forth-order PAC coefficient for NAN D1 (-0. 020 and -0. 014, severally) . FARO has important positive AC and PAC at the first slowdown and a important AC at the 3rd slowdown. The L-B trial provides stronger grounds against the void hypothesis that amount of the squared autocorrelations up to 5 slowdowns is zero for all stocks and indices at all important degrees, based on which we confirm our consequence that squared log-returns do non follow a random walk. Another contrasting consequence with that of log-returns is that about all the autocorrelation coefficients are positive, bespeaking a stronger positive consecutive dependance in squared log-returns.

In footings of monthly informations, merely FEIC and NAN D10 have important positive third-order AC and PAC estimations. Other stocks and indices have coefficients non significantly different from nothing. The consequence is supported by Ljung-Box trial statistics demoing that Q values are merely statistically important in the 3rd slowdown for both FEIC and NAN

D10. This is consistent with the consequence reached for log-returns above, which says that monthly returns appear to be more random than day-to-day returns.

A. 3. Trials for the Absolute Values of Log-Returns

Table V provides autocorrelation consequences for the absolute value of log-returns in similar mode. However, as will be discussed below, the consequences are even more contrasting than that in Table IV.

In Panel A, all the stocks and indices have important positive consecutive correlativity while undistinguished PAC estimations are merely displayed in slowdown 5 for both FARO and LION. Supporting above consequence, Q values supply grounds against the void hypothesis of no autocorrelation. Therefore, absolute value of day-to-day log-returns exhibit stronger consecutive dependance than in Table III and IV, and autocorrelations are purely positive for all stocks and indices. Coming to the absolute value of monthly log-returns, merely FEIC shows important single and joint consecutive correlativity. NAN D1 besides displays a important Q value in slowdown 2 at 5 % degree, but it is undistinguished at 1 % degree.

Based on the above grounds, two consistent decisions can be made at this point. First of all, by altering ingredients in our trial from log-returns to squared log-returns and absolute value of log-returns, more positive consecutive correlativity can be observed, particularly in day-to-day informations. Therefore, return discrepancies are more correlative. Second, monthly returns tend to follow a random walk theoretical account better than day-to-day returns.

A. 4. Correlation Matrix of Stocks and Indexs

Table VI presents the correlativity matrix for all stocks and indices. As is shown in Panel A for day-to-day consequence, all of the correlativities are positive, runing from 0. 0551 (LION-FARO) to 0. 5299 (NAN D10-FEIC) . Within single stocks, correlativity coefficients do non differ a batch. The highest correlativity is between FEIC and FARO with merely 0. 1214, bespeaking a reasonably weak relationship between single stocks returns. However, in footings of stock-index relationships, they differ drastically from 0. 0638 (NAN D10-FARO) to 0. 5299 (NAN D10-FEIC) . While the positive correlativity implies that the three stocks follow the indices in the same way, the extent to which they will travel with the indices is rather different, bespeaking different degrees of hazard with respect to different stock. Finally, we find that the correlativity between NAN D10 and NAN D1 is the 2nd highest at 0. 5052.

Panel B provides the correlativity matrix for monthly informations. Similar to consequences for day-to-day informations, negative correlativity is non observed. The highest correlativity attributes to that between NAN D10 and FEIC (0. 7109) one time once more, but the lowest is between LION and FEIC (0. 1146) this clip. Compared with consequences in Panel A, correlativity within single stocks is somewhat higher on norm. The betterment in correlativity is even more obvious between stocks and indices. It implies that stock monetary values can alter dramatically from twenty-four hours to twenty-four hours, but they tend to follow the motion of indices in a longer skyline. Finally, the correlativity between two indices is one time once more the 2nd highest at 0. 5116, following that between NAN D10 and FEIC.

It is besides found that the correlativity between indices improves merely marginally when day-to-day informations are replaced by monthly informations, bespeaking a comparatively stable relationship between indices.

B. Variance Ratio Trials

The consequences of discrepancy ratio trials are presented in Table VII for each of the three stocks and two decile indices. The trial is designed to prove for the void hypothesis of a random walk under both homoskedasticity and heteroskedasticity. Since the misdemeanor of a random walk can ensue either from altering discrepancy, i. e. heteroskedasticity, or autocorrelation in returns, the trial can assist to know apart grounds for divergence to some extent. The slowdown orders are 2, 4, 8 and 16. In Table VII, the discrepancy ratio (VR (Q)) , the homoskedastic-consistent statistics (Z (Q)) and the heteroskedastic-consistent statistics (Z* (Q)) are presented for each slowdown.

As is pointed out by Lo and MacKinlay (1988) , the discrepancy ratio statistic VR (2) is equal to one plus the first-order correlativity coefficient. Since all the autocorrelations are zero under RW1, VR (2) should be one. The decision can be generalised farther to province that for all Q, VR (Q) should be one.

Harmonizing to the first Panel in Table VII, of all stocks and indices, merely LION and NAN D1 have discrepancy ratios that are significantly different from one at all slowdowns. Therefore, the void hypothesis of a random walk under both homoskedasticity and heteroskedasticity is rejected for LION and

NAN D1, and therefore they are non weak-form efficient because of autocorrelations. In footings of FARO, the void hypothesis of a homoskedastic random walk is rejected, while the hypothesis of a heteroskedastic random walk is non. This implies that the rejection of random walk under homoskedasticity could partially ensue from, if non wholly due to heteroskedasticity. On the other manus, both FEIC and NAN D10 follow random walk and turn out to be efficient in weak signifier, matching precisely to the autocorrelation consequences reached before in Table III.

Panel B shows that when monthly informations are used, the void hypothesis under both signifiers of random walk can merely be rejected for FARO. As for FEIC, the random walk void hypothesis is rejected under homoskedasticity, but non under heteroskedasticity, bespeaking that rejection is non due to altering discrepancies because Z* (Q) is heteroskedasticity-consistent.

As is shown in Panel A for day-to-day informations, all single stocks have discrepancy ratios less than one, connoting negative autocorrelation. However, the autocorrelation for stocks is statistically undistinguished except for LION. On the other manus, discrepancy ratios for NAN D1 are greater than one and increasing in Q. The above determination provides auxiliary grounds to the consequences of autocorrelation trials. As Table III shows, NAN D1 has positive autocorrelation coefficients in all slowdowns, proposing a impulse consequence in multiperiod returns. Both findings appear to be good supported by empirical grounds. While day-to-day returns of single stocks seem to be decrepit negatively correlated (Gallic and Roll (1986)) , returns for best executing market indices such as NAN D1 show strong positive autocorrelation (Campbell, Lo, and MacKinlay (1997)) . The fact

that single stocks have statistically undistinguished autocorrelations is chiefly due to the specific noise contained in company information, which makes single security returns unpredictable. On the contrary, while the positive consecutive correlativity for NAN D1 violates the random walk, such divergence provides investors with assurance to calculate future monetary values and dependability to do net incomes.

C. Griffin, Kelly and Nardari DELAY Trials

The consequences of delay trial for the three stocks and two decile indices over the January 2000 to December 2005 period are summarised in Table VIII. We use lag 1, 2, 3, 4 for the day-to-day informations and 1, 2, 3 for the monthly informations.

As is presented in Panel A for day-to-day returns, Delay_1 value for NAN D10 is close to zero and therefore non important, while NAN D1 has the highest hold among all stocks and indices. The rank of hold within single stocks seems to hold a positive relationship between size and hold value, by demoing that hold of LION, the stock with little market capitalisation is lowest, while the hold of FEIC, the stock with largest market capitalisation is highest. It seems to belie with the Griffin, Kelly and Nardari (2006) survey, which says that there is an reverse relationship between size and hold. One possible account for that is that hold calculated by day-to-day informations on single houses is noisy.

The scaly step Delay_2 produces consistent decision but with higher magnitude in values. Delay_2 values are really different from nothing for FARO, FEIC, LION and NAN D1. The largest addition in value is seen in FARO

from 0. 0067 for Delay_1 to 0. 7901 for Delay_2. Therefore, Griffin, Kelly and Nardari hold step is preferred, because the scaly version can ensue in big values without economic significance.

As is displayed in Panel B, using monthly informations besides leads to higher Delay_1 values, bespeaking that more fluctuation of monthly returns are captured by lagged market returns and hence monthly returns are non every bit sensitive as day-to-day returns to market-wide intelligence. However, an opposite relationship is found this clip between hold and market value of single stocks. Therefore, monthly informations provides consistent consequence to back up Griffin, Kelly and Nardari (2006) consequence as one would usually anticipate larger stocks to be more efficient in reacting to market. Similar to the consequence for day-to-day informations, scaly step one time once more produces higher values than its alternate but it provides the same consequences.

V. Conclusion

The chief aim of this paper is to prove weak-form efficiency in the U. S. market. As is found by selected trials, NAN D10 and FEIC provide the most consistent grounds to demo weak-form efficiency, while the divergence from random walk is suggested for other stocks and indices, particularly for NAN D1 and LION. It indicates that security returns are predictable to some grade, particularly for those holding best and worst recent public presentation.

The three autocorrelation trials provide different consequences in footings of day-to-day returns. While the void hypothesis of random walk is rejected for NAN D1 and LION based on log-returns, it is rejected for all stocks and

indices based on both squared and absolute value of log-returns, bespeaking that return discrepancies are more correlative. On the other manus, consequences in the context of monthly returns are consistent. Monthly returns follow a random walk much better than day-to-day returns in all three trials. Most obviously, the autocorrelation trial fails to reject the presence of random walk for all stocks and indices when monthly log-returns are employed.

The discrepancy ratio trials provide supportive grounds for autocorrelation trials. Both trials find that in footings of day-to-day return, NAN D1 and LION show a important return dependance. In peculiar, variance ratios for NAN D1 are all above one, matching to its positive AC and PAC coefficients, therefore connoting positive autocorrelation in returns. What ‘ s more, single stocks have discrepancy ratios less than one with FEIC and FARO both being insignificant. The above grounds once and for all suggest that while single stock returns are decrepit negatively related and hard to foretell, market-wide indices with outstanding recent public presentation such as NAN D1 tend to demo a stronger positive consecutive correlativity and therefore offer predictable net income chances.

The grounds sing hold trials is consistent with earlier findings to a big extent. NAN D1 has highest hold in both day-to-day and monthly instances, connoting an inefficient response to market intelligence. In the context of monthly log-returns, hold values for single stocks rank reciprocally based on market capitalization with larger cap stocks holding lower hold, proposing that little stocks do non capture past public information rapidly and are therefore inefficient.

Finally, divergence from a random walk theoretical account and therefore being weak-form inefficiency is non needfully bad. In fact, investors should be rewarded a certain grade of predictability for bearing hazards. Therefore, future research could be done by integrating hazard into the theoretical account.

[1] Company information is chiefly obtained from Thomson One Banker database.

[2] Griffin, John M. , Patrick J. Kelly, and Federico Nardari, 2006, Measuring short-run international stock market efficiency, Working Paper