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Predicting Daily Stock Returns; A Lengthy Study of the Hong Kong and Japan Stock Exchanges

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ABSTRACT

If stock markets are efficient then it should not be possible to predict stock returns, namely, no explanatory variable in a stock market regression model should be statistically significant. In this study, we find results indicating that daily effects exist in stock market returns. These daily or Calendar effects previously shown to exist by others clearly indicate the purpose of this study. Researchers often equate stock market efficiency with the non-predictability property of time series of stock returns. The purpose is to explore whether this line of argument is or is not satisfactory and does or does not aid in furthering our understanding of how markets operate. We focus on one definition of capital market efficiency and on the experience of these principles in analyzing the performance of the two large Asian Stock Market exchanges, which are Japan and Hong Kong. We observe that stock market returns (which include closing prices and dividends) are predictable and there are explanations for short-term predictability. Japan and Hong Kong were the focus of this study because of the maturity of their financial markets and the availability of clean data on these markets from a reputable and available resource. Furthermore, to reduce the influence of the Pandemic (2020-2022, the author studied a data base for a large number years prior to the era of the global Pandemic to reduce the argument that the era studed was a large enough sample and the influence of special variation associated variation associated with the unusual health period was reduce to nothing.

KEYWORDS

Market Efficiency, Prediction, Stock Returns, Dailey Effects, Time Series

Purpose

The purpose of this research study is to show the existence of time series characteristics of daily stock prices of securities marketed on the Hong Kong and Tokyo stock exchanges. This study does not focus on index numbers of daily stock market prices but rather on the stock returns of traded securities because we wish to study whether the efficient markets hypothesis (EMH) applies or does not apply in these markets. Returns refer to both the closing prices of individual securities and dividends associated with those securities. Furthermore, this study is important because market efficiency applies in short-term forecasting of closing returns of traded securities listed on the Hong Kong and Tokyo exchanges.

For a very long time, *management scientists* and *financial and economic forecasters* studied the sources of variations in the behavior of stock returns for firms listed on the established financial markets. By the early 1970's, many financial economists and management scientists suggested that stock markets were often thought to be unpredictable. Fama (1970) provided an early, definitive statement of this position. Historically, the *random walk* theory of stock returns was preceded by theories relating movements in the financial markets to the business cycle. A well-known example is the interest shown by John Maynard Keynes in the variation in stock returns over the business cycle. According to Skidelsky (1992) "Keynes initiated what was entitled an *Active Investment Policy*, which coupled investing in real assets (a revolutionary concept at the time) with constant switching between short-dated and long-dated securities, based on predictions of changes in interest rates (Skidelsky, 1992, p.26). Many studies of these phenomenon appeared in the financial time series literature later. Goh and Kok (2006) Capital market efficiency provides a simple model incorporating intraday seasonality produced lower forecast errors than a random walk model for data of the Malaysian Stock Exchange.

One important issue is the empirical analysis of financial time series to determine if returns on risky assets are serially independent. This is a requirement of the efficient market hypothesis in its weak form, i.e., the current stock

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prices fully reflect all the past stock price information. A precise formulation of an empirically refutable efficient market hypothesis must be model specific. Historically the majority of such tests focused on the predictability of common stock returns. Hence, we classify most studies under the paradigm of the "*random walk theory*" of stock market prices.

In addition, the Monday effect (and other daily effects) in daily stock returns and indexes for these daily stock returns are found in Cho, Linton and Whang (2007), Couts and Hayes (1999), Mehidian and Perry (2001), Pettengill (2003), and Steeley (2001). For the most part, these studies found strong evidence of Monday and other calendar effects in the index of stock returns in the exchanges studied. We focus in this study on stock returns in two of the largest Asian markets (Hong Kong and Japan) to determine if such effects exist for individual firms as well as stock indexes. These markets are useful to study because they are mature Asian financial markets and sources of information about them are both clean and available. If calendar effects exist, we may comment on the operational characteristics of these markets. Most important, these national stock exchanges are not classified as noted before are not emerging markets or some other term indicating that are not comparable to Western or mature or well-developed markets of industrial nations.

Capital market efficiency is an important research topic since Fama (1955, 1970) explained these principles as a portion of the hypothesis involving capital market efficiency. Following Fama's work many capital markets researchers devoted themselves to investigating the randomness of stock price movements. Their purpose was to demonstrate the efficiency of capital markets and later other studies demonstrated market inefficiencies by identifying systematic and permanent variations in stock market returns.

Lucas (1978) theoretically explained the stochastic behavior of equilibrium asset process in a single good, "pure exchange economy with identical consumers" which included that one can construct rigorous economic models that do not possess the random character of stock prices as well as the those that do. We investigate those that do not. Using variance-ratio statistical tests, Lo and MacKinley (1988) rejected the hypothesis that prices follow random walks for daily and weekly returns. They found no empirical evidence against the random walk hypothesis for monthly returns. They determine , however, that portfolio returns of the New York Stock Exchanges (NYSE) and the American Stock Exchange (AMEX) stocks exhibit significant first-order serial correlations while security returns present negative first-order autocorrelation although statistically not significant. These results corroborated French and Roll (1986). Lo and MacKinley (1990) indicated a different serial correlation sign between portfolios and stock may explain by lead-lag positive serial correlation across securities. Poterba and Summers (1988) found negative serial autocorrelation in monthly returns for a NYSE value-weighted index during the period 1926-1985. Others (Lo and Mackinley (1988)) obtained different results for a different time period. Jarrett and Kyper (2005a) found that many time series of closing prices of U.S. stocks exhibited a unit root identified by the Augmented Dickey-Fuller test. Hamori and Takihisa (2002) examined nonseasonal unit roots to achieve stationarity in stock price indexes of **G7** nations. Moreover, calendar or time effects do contradict the weak form of the efficient market hypothesis (EMH). The weak form refers to the notion that the market is efficient in past returns and volume information and we do not predict stock return movements accurately using historical information. If no systematic patterns exist, stock returns may be time invariant. By contrast, if variation in the time series of daily returns exist, market inefficiency is probably present and investors may earn abnormal rates of return not in line with the degree of risk they undertook (Francis 1993). In addition, a large number of studies in the literature on predicting prices of traded securities confirm to some degree that patterns exist in stock market returns and prices. We know interest rates; dividend yields and a variety of macroeconomic variables exhibit clear business cycle patterns. The emerging literature concerning studies of United States securities include Balvers et al (1990), Breen et al (1990), Campbell (1987), Fama and French (1989) and Pesaran and Timmermann (1994,1995), Granger (1992) provides a up to that time survey of methods and results. Studies in other places (the United Kingdom) include Clare et al (1994) Clare at al (1995), Black and Fraser (1995) and Pesaran and Timmermann (2000). Furthermore, Caporale and Gil-Alana (2002) pointed out that for US stock returns their degree of predictability depends on the process followed by the error term.

The expansion of time series analysis as a discipline permits one to analyze stock market prices in ways not heretofore explored. What is the predictability of the error term and is there predictability in daily stock market returns? Peculiar problems arise when daily patterns are present in stock price data. We know that stock prices possess patterns known as daily effects. For example, Kato (1990a) results suggested that were patterns in stock returns in Japanese securities. He observed low Tuesday and high Wednesday returns within weekly prices. If a

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week did not have trading on a Friday, he would observe effects related to the Monday of the following week. The following Monday would have low returns indicating that transference of the pattern that would occur on the Friday if trading had occurred which it did not. A second study by Kato (1990b) found considerable anomalies on the Tokyo Stock Exchange (TSE), which is an organized exchange similar to the ones in North America.

Some studies focused on the investigation of time series components of equity returns and the predictability of these returns. Ray, Chen and Jarrett (1997) investigated a sample of 15 firms and found both permanent and temporary systematic components in individual time series of stock market returns of firms over a lengthy period of time. Moorkejee and Yu (1999) investigated the seasonality in stock returns on the Shanghai and Shenzen stock markets. They documented the seasonal patterns existing on these exchanges and the effects these factors have on risk in investing in securities listed on these exchanges. In addition, they observed that risk in investing relates to the predictability of security returns. Rothlein and Jarrett (2002) also investigated the existence of calendar seasonality present in Japanese stock returns, which affect the prices of these securities. They documented the evidence of seasonality in the 55 randomly selected time series from the Japanese Stock exchange for a period of 18 years (1975 through 1992). In addition, they indicated the accuracy of forecasts or predictions of these firms' prices are seriously decreased if one does not recognize the patterns in the time series.

Kubota and Takehara (2003) investigated whether the activity of financial firms creates value and/or risk to the economy within the asset pricing framework. They used stock return data from non-financial firms listed in the first section of the Tokyo Stock Exchange. Their value-weighted index which was solely composed of non-financial firms was augmented with the index of the firms from the financial sector. In turn, they estimated the multivariate asset pricing model with these two indices. We note that their procedure can simultaneously take into account the cross-holding phenomena among Japanese firms, especially between the financial sector and the non-financial sector. In conclusion their financial sector model helps explain the return and risk structure of Japanese firms during the so-called "double-bubble" period indicating some predictability in closing prices of Japanese securities.

Jarrett and Kyper (2005b) indicated how patterns in monthly stock prices have predictable patterns. This study differs in that we examine the predictable patterns in the closing daily prices of stock prices. We go further than the study of Caporale and Gil-Alana (2002) noted before because we attempt to determine the patterns in daily prices of listed securities. The author, also, does not study the effects of cross-holding on the Japanese markets (Yonezawa and Lee, 1998) nor on how the Hong Kong market achieved the status of number two in Asia after Japan (Yan-Ki Ho, 1998).

This study differs in that we examine the predictable patterns in the closing daily prices of stock prices. In goes further than the study of Caporale and Gil-Alana (2002) noted before because it attempts to determine the patterns in daily prices of listed securities. Caporale and Gil-Alana (2002) did test for unit roots in the stock market though unlike this study, they test this hypothesis within fractionally integrated alternatives. Fractional differencing is generally employed to predict long-term rather than short-term properties of time series. Shum and Tang (2005) further explained additional factors such as contemporaneous market excess returns relating to variation in several Asian Stock Markets. Finally, Jarrett and Kyper (2006) studied the predictability of daily returns on more than 50 firms listed on American Stock Exchanges and concluded that daily variation exists and is predictable. This model is similar but not the same as that of Aesii (2006) who studied the Italian Stock Exchanges. Last, no study of special events such as insider trading (Wong, Cheung, and Woo, 2000) in these Asian exchanges.

Methodology and Models

The predictive (or regression) model for measuring the effects of changes in the day of the week on closing prices of a security is

$$Y = b_o + b_1W_1 + b_2W_2 + b_3W_3 + b_4W_4 + b_5W_5 + \varepsilon \quad \text{(Model 1)}$$

Where Y = daily return for the security (**dretwd)**

W_2 = dummy (or categorical) variable for Tuesday (1 or 0 when not Tuesday)

W_3 = dummy variable(or categorical) for Wednesday (1 or 0 when not Wednesday)

W_4 = dummy variable(or categorical) for Thursday (1 or 0 when not Thursday)

W_5 = dummy variable (or categorical) for Friday (1 or 0 when not Friday)

ε = error term with mean of zero, and

b_o = intercept (or constant) of the model.

Note we borrow from the methodology employed by Jarrett and Kyper (2006) in their study of firms listed in United States Stock Exchanges. We collected data on firms listed on the Hong Kong Stock Exchanges from 1980 through 2002. These data are from the Pacific Basin Financial Markets Research Center (PACAP) at the University of

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Rhode Island. Also, we collected from the same source the time series for the Tokyo Stock Exchange from 1975 through 2004. The data were for Japanese firms listed on this Tokyo Stock Exchange data base. Other Asian exchanges are considerably smaller than the two studied, however, Singapore can no longer be considered a small exchange. Data for Shanghai and Shenzhen (China) are not available at this time from the same source. Although one study suggests costs of trading in Chinese Stock markets are available for study (Tian, Wan, and Guo, 2002). The study period included the latest available data at the beginning of this study. Each year studied contained more than 300 hundred days of data for each firm for each included in the data base. Hong Kong contained more than six hundred firms and Tokyo contains more than 2600 hundred firms. Hence, we concluded that sufficient data was available for an extensive analysis. PACAP collects the data from the stock exchanges themselves so their data is the same as if one were to follow the end of day data for each trading day of the year for each exchange. The methodology for reporting these data are thus the same as if the researchers collected the data themselves on a day-to-day basis. Since the Tokyo Stock Exchange traded on Saturday until 1990, another dummy variable W_6 was included in the model for years 1975 through 1989 for the Saturday trading day. The coefficient b_6 would be the regressive coefficient for W_6.

In addition, we considered a second predictive based on data available from our source as follows (Model 2):

$$Y = b_o + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6(\text{trdvol}) + b_7(\text{trdval}) + \varepsilon$$

Where Y = daily return for the security (**dretwd)**

X_2 = dummy variable for Tuesday (1 or 0 when not Tuesday)

X_3 = dummy variable for Wednesday (1 or 0 when not Wednesday)

X_4 = dummy variable for Thursday (1 or 0 when not Thursday)

X_5 = dummy variable for Friday (1 or 0 when not Friday)

(trdvol) = variable for volume of daily trade in units

(trdval) = variable for value (in currency) of daily trade

ε = error term with mean of zero, and

b_o = intercept of model.

The second permits further explanation of the sources of variation in daily stock market returns. Hence, our research will show if the sources of variation in daily returns are days of the weeks with and without other sources of variations in returns. Again, since the Tokyo Stock Exchange traded on Saturday until 1990, another dummy variable W_6.

The Results

Estimations for the ordinary least squares (OLS) models for Hong Kong time series data sets produced results noted in Table A for the response variable daily returns¸dretwd. For the Hong Kong data set, the tests for significance of the dummy variable for day of the week indicated some very important results. The computed p-values were for the most part very close to zero,**0**, for almost all of the coefficients of the dummy variables in each regression. The exceptions include **Thursday** in 1980, **Wednesday** in 1984, **Thursday** in 1986, **Tuesday** in 1988, **Thursday** in 1988, **Thursday** in 1998, **Wednesday** in 1999and **Tuesday** and **Thursday** in 2001. There is no clear explanation to this except to note the principle that if one does enough significant tests a certain number will show significance by unexplainable

factors, perhaps chance alone. The total number of exceptions was thus small in comparison to the number of tests of significance for the regression coefficients performed. F-values for the test of overall regression for every year except 1984 were significant at very small p-values. The Durbin-Watson (DW) statistic for each regression was large enough for us to conclude that no significant serial correlation was present in the data. The conclusion for the DW statistics adds to the validity of the previous significance tests for the regression coefficients and tests for overall regression. These results indicate that for the Hong Stock Exchange that each day of the week has a separate regression resulting in five parallel lines when plotted on a time series graphs. This is the result that we were hoping would occur.

Plots of residuals (not shown here) did not produce evidence of a violation of the usual assumptions concerning the error term (i.e., linearity, homoscedasticity and serial correlation) of least square regression. Regression results are always subject to limitations on the sample study period and the elements (firms) under study. However, the compelling results indicate for the Hong Kong Stock exchanges that there is a day of the week effect on the closing prices of securities. We not further that the notion that closing prices of securities for these firms in the Hong Kong markets follow random walks is in doubt. We do not dispute that these markets do not function well nor do we conclude that consistent abnormal profits based on public or historical information are common.

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In addition, Model 2 regressions (Table B) indicate very similar results to that for Model 1. Although two additional variables, trdvol and trdval, included in the regressions result for the most part significant (though small) coefficients, the vast majority of coefficients for the daily dummy variables were significant s at very small p-values. Again, this would indicate that our notion that there are daily effects on the returns to Hong Kong stock for the sample period studied is supported. Also, the notion that the weak form of the EMH is not supported.

Table C contains the results of applying Model 1 to the data for years 1975 through 2005 for the stock market of Japan. Recall that for 1975 through 1989, Saturday was a trading day in Tokyo. Our results for Model 1 are similar to that for Hong Kong. Only 9 of the coefficients for the daily dummy variable were not shown to be significant at small p-values. Four of them occurred in 2004 indicating an exceptional circumstance for that year. Due to the largeness of sample sizes the F-values were significant except for year 2004. Again, the DW statistics were large enough (except for 2004) to add to the validity of the earlier significant tests for the coefficients. Thus, for the time period covered and sample firms studied , we again conclude that there are Calendar effects and the weak form of EMH is in question.

Model 2 regressions for the Tokyo stock exchange (Table D) produced results similar to the ones noted above in Table C. With the exception of 2004, the results indicate the daily influences on the returns to Japanese securities list on the Tokyo stock exchange are very similar to the results noted in Table C. The inclusion of the trdvol and trdval variables did not alter the general conclusion of the earlier research noted in Tables C and for Hong Kong in A and B. We should note some conclusion about the Saturday trading day for Tokyo from 1975 through 1989. Of those fifteen Saturday trading only the one for year 1988 did not produce a significantly small p-value for the regression coefficient. Hence, Saturday, for the most part, produced trading evidence different from the other days of the week.

The four tables containing about eighty multiple regressions for very large samples produce evidence indicating that trading on these two large exchanges differed from day-to-day. Also, the Durbin-Watson (DW) statistics were such as to not reject the notion (hypothesis) that serial correlation is present. This adds to the validity of the various significance tests associated with the p-values.

We should note that some researchers agree that stock return data have heavy tails and tend not to be normally distributed so the OLS (ordinary least squares results may be suspect. Hence, OLS results may be suspect so outliers or heavy tails may result in inconsistent estimators. Some say ARCH-GARCH methods would be needed to correct for inconsistencies tin the analysis and all OLS regressions should be run again. Greater standard errors lead to error in observing significant tests concerning parameters and so forth. Hence as in previous studies, we considered doing again a portion of the analysis using quantile regression similar to Cho, Linton and Whang (2006). Based on their results, we expect this new analysis would be similar to our OLS results and the new analysis would be unnecessary. Cho, Linton and Whang (2006, 2007)

contain in their studies sufficient evidence to make our results valid. Last, we should point out that our data source gave us at the commencement of this lengthy study all data collected by them and put into a useful format for processing by standard statistical methods using the one very standard programming and software system, **SAS™**.

Note the tables (A, B, C and D) contain the entire analysis in a usable format detailing the results observed previously. The purpose was to analyze the results for individual firms and not for stock indexes. We could have studied on a few firms over a long period or studied a large number of sampled firms for a short (few years) period. Others have done this and their work is available (as noted before). The achievement of this study is not a statistical exercise but an analytical study to explain the economic behavior of markets. Hong Kong and Tokyo are established markets with regulations and a large and world-wide constituency. The author established in this study the relationship between economic explanations of financial events and analytical results concerning a large sample of firms over a lengthy time period on the two well established Asian financial markets. A study of this magnitude is heretofore not been published in this journal with these data. Most important, the author established for individual firm behavior explanations for the analytical results.

Conclusions

We document in this study that daily closing prices for a huge number of firms listed on two of the largest Asian stock exchanges contain properties, which one can measure, model and use for prediction. With enough time, patience and understanding of the mathematics of the underlying processes that give rise to a time series, forecasters can properly model these time series. The results permit management scientists and financial forecasters to view time series of returns of listed securities are not random and do have daily affects. Hence, in this study, we indicate substantially the existence of time series components in stock returns for a randomly selected set of firms traded on

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the two largest Asian stock exchanges. The results corroborate results of a number of earlier but less exhaustive studies. Calendar and daily effects exist in the financial time series stock returns studied. When these properties in security returns exist, one may identify and forecast patterns in financial data, and, in turn, investors may benefit from this information. Furthermore, the results indicate that the weak form of the efficient markets hypothesis is in question when one must make decisions concerned with investing in stock market securities. Daily variation is neither random nor stochastic and possibilities exist to predict daily patterns with some degree of accuracy. We suggest, for purposes of prediction that forecasters predict systematic time series components of security returns. In addition, one cannot understate the importance of stock returns and portfolio risk. These factors coupled with recognition of systematic time series components (daily variation in this study) in stock prices can make one a better forecaster for prices of individual securities and contribute to the literature on capital market efficiency. One last question concerns the out-of sample trading profit opportunities. Finding in-sample profit opportunities can be thought of as a "data-mining" result, that is, if you fit many models a few will randomly have high coefficients of determination and/or statistically significant model coefficients. We suggest using parsimonious (least costly and simplest) models; the profitable opportunities should be greater than transaction costs that may include bid-ask spreads and commissions. If so, we can find profitable trading opportunities in rapidly growing markets in Asia. When the opportunity arises to examine data for Shanghai and other emerging Asian exchanges, we expect additional studies of those huge and growing markets. We are only limited by our ability to collect sufficient and reliable data.

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References

[1] Alesii, G. (2006) "Fundamental Efficiency of the Italian Stock Market: Some Long Run Evidence," *International Journal of Business and Economics*, 5 (3), 245-264.

[2] Balvers, R.J., Cosimano, T.F. and MacDonald, B. (1990) "Predicting Stock Returns in an Efficient Market." *Journal of Finance*, 45, 1109-28.

[3] Black, A. and Fraser, P. (1995) "UK Stock Returns: Predictability and Business Conditions." *The Manchester School Supplement*, 85-102

[4] Breen, W., L.R. Glosten, and R. Jagannathan (1990) "Predictable Variations in Stock Index Returns." *Journal of Finance*, 44, 1177-89.

[5] Campbell, J.Y. (1987) "Stock Returns and the Term Structure." *Journal of Financial Economics*, 373-99.

[6] Caporale, G.M. and L.A. Gil-Alana, (2002) "Fractional integration and mean reversion in stock prices," *Quarterly Review of Economics and Finance*, 42, 3,599-609.

[7] Clare, S.D., Thomas, S.H., and Wickens, M.R. (1994) "Is the Gilt-Equity yield Ratio Useful for Predicting UK Stock Return?" *Economic Journal*, 104, 303-15.

[8] Clare, A.D., Psaradakis, Z., and Thomas, S.H. (1995) "An Analysis of Seasonality in the UK Equity Market." *Economic Journal*, 105, 398-409.

[9] Cho, Y.H., Linton, O. and Whang, Y.J. (2006) "Are there Monday effects in Stock Returns :A Stochastic Dominance Approach." Additional Appendices available from o.linton@lse.ac.uk.

[10] Cho, Y.H., Linton, O. and Whang Y.J. (2007) "Are there Monday effects in stock returns: A stochastic dominance approach," *Journal of Empirical Finance*, 14, 5, 736-755.

[11] Couts, J.A. and Hayes, P.A. (1999) "The weekend effect, the stock exchange account and the financial times industrial ordinary shares index: 1987-1994, "*Applied Financial Economics*, 9, 67-71.

[12] Dickey, D.A. and W.A. Fuller (1979) "Distribution of the Estimators for autoregressive Time Series with a Unit Root," *Journal of the American Statistical Association*, 74,427-431.

[13] Diebold F.X. and G.D. Rudebusch (1994) On the Power of Dickey Fuller Tests Against Fractional Alternatives," Economics Letters 35, 155-160.

[14] Fama, E.F. (1955) "The Behavior of Stock Market Prices," *Journal of Business*, 38, 34-105.

[15] Fama, E.F. (1970) "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance*, 25, 383-417

[16] Fama, E.F., and French, K.R. (1989) "Business Conditions and Expected Returns on Stocks and Bonds." *Journal of Financial Economics*, 25, 23-49.

[17] Francis, J.C. (1993) *Management of Investments*, New York: McGraw-Hill.

[18] Goh, K., K. Kok (2006) (Beating the Random Walk: Seasonality and Volatility in a Developing Market," *International Journal of Business and Economics*, 5 (1) 29-40.

[19] Granger, C.W.J. (1992) "Forecasting Stock Market Prices: Lessons for Forecasters." *International Journal of Forecasting*, 8, 3-13.

[20] Hassler, U. and J. Wolters (1994), "On the power of Unit Root Tests against Fractional Alternatives", Economics Letters 45, 1-5.

[21] Hamori, S. and A. Tokihisa (2002) "Some International Evidence on the Seasonality of Stock Prices," *International Journal of Business and Economics*, 1 (1) 79-86.

[22] Jarrett, J. and E. Kyper (2005a) "Daily Variation, Capital Market Efficiency and Predicting Stock Returns, *Management Research News*, 28, 8, 34-47.

[23] Jarrett, J. and E. Kyper (2005b), "Evidence on the Seasonality of Stock Market Prices of Firms Traded on Organized Markets," *Applied Economics Letters*, 12, 537-543.

[24] Jarrett, J. and E. Kyper (2006), "Capital market efficiency and the predictability of daily returns," *Applied Economics* 38, 631-636.

[25] Kato, K. (1990a) "Weekly Patterns in Japanese Stock Returns." *Management Science*, 36, 1031-1043.

[26] Kato, K. (1990b) "Being a Winner in the Tokyo Stock Market." *Journal of Portfolio Management*, 16, 52-56.

[27] Kubota, K. and H. Takahara (2003), "Financial Sector Risk and the Stock Returns: Evidence from Tokyo Stock Exchange Firms, "Asia-Pacific Financial Markets, 10, 1, 1-85.

[28] Kwiatkowski, D. P.C.B. Phillips, P. Schmidt, and Y. Shin (1992) "Testing the Null Hypothesis of Stationarity against the Alternative of a Unit Root," Journal of Econometrics 54, 159-178.

[29] Lo, A.W. and A.C. MacKinley (1988) "Stock Market Prices Do Not Follow a Random Walk: Evidence from a Simple Specification Test," *Review of Financial Studies*, 1, 41-66.

[30] Lo, A.W. and A.C. MacKinley (1990) "When are Contrarian Profits Due to Stock Market Overreaction?" *Review of Financial Studies*, 3, 175-205.

[31] Lucas, JR. R. E. (1978) "Asset Prices in an Exchange Economy," *Econometrica*, 46 (6) 1429-1445.

[32] MacKinnon, J.G. (1991) "Critical Values for Cointegration Tests," Chapter 13 in *Long-run Economic Relationships: Readings in Cointegration*, edited by R.F. Engle and C.W.J. Granger, Oxford University Press.

[33] Mehdian, S. and Perry, M (2001) "The reversal of the Monday effect: new evidence from US equity markets," *Journal of Business Finance and Accounting*, 28, 1043-1065.

[34] Moorkejee, R. and Q. Yu (1999) "Seasonality in Returns on the Chinese Stock Markets: The Case of Shanghai Shenzhen," *Global Finance Journal*, 10, 93-105.

[35] Ng, S. and P. Perron (2001), "Lag Selection Criterion and the Construction of Unit Root Tests with Good Size and Power," Econometrica 69, 1519-1554.

[36] Pesaran, M.H. and Timmermann, A. (1995) "The Robustness and Economic Significance of Predictability of Stock Returns," *Journal of Finance*, 50, 1201-1228.

[37] Pesaran, M.H. and Timmermann, A. (2000) "A Recursive Modeling Approach to Predicting UK Stock Returns." *The Economic Journal*, 110, 159-191.

[38] Pettingill, G. (2003) "A Survey of the Monday effect literature," *Quarterly Journal of Business and Economics*, 42, 3-27.

[39] Phillips, P.C. B. and P. Perron (1988), "Testing For a Unit Root in a Time Series Regression, "Biometrika 75, 335-346.

[40] Poterba, J. M. and L.H. Summers (1988) "Mean Reversion in Stock Prices: Evidence and Implications, *Journal of Financial Economics*, 22, 27-59.

[41] Ray, B., Chen S. and J. Jarrett (1997), "Identifying Permanent and Temporary Components in Japanese Stock Prices," *Financial Engineering and the Japanese Markets*, 4, 233-256.

[42] Rothlein, C.J. and J. Jarrett (2002) "Seasonality in Prices of Japanese Common Stock." *International Journal of Business & Economics*, 1, 21-31.

[43] Said S.E. and E.A. Dickey (1984), "Testing for Unit Roots in Autoregressive Moving Average Models of Unknown Order," *Biometrika*, 71, 599-607.

[44] Shum W.C. and G.Y.N. Tang (2005), "Common Risk Factors in Returns in Asian Emerging Stock Markets," *International Business Review*, 14, 6, 695-717.

[45] Skidelsky, Lord Robert, (1992) John Maynard Keynes, Vol. 2, Macmillan Publishers.

[46] Steeley, J.M. (2001) "A note on information seasonality and the disappearance of the weekend effect in the UK stock market," *Journal of Banking and Finance*, 25, 1941-1956.

[47] Tian, G.G., Wan, G.H. and M. Guo (2002) "Market Efficiency and the Returns to Simple Technical Trading Rules: New Evidence from the U. S. Equity Market and Chinese Equity Markets," *Financial Engineering and the Japanese Markets*, 3-4, 241-258.

[48] Wong, M.C.S., Cheung, Y-L and L. Wu (2000) "Insider Trading in the Hong Kong Stock Market," *Financial Engineering and the Japanese Markets*, 7 (3) 275-288.

[49] Yan-Ki Ho, R. (1998) "The Hong Kong Securities Markets: Review and Prospects," *Financial Engineering and the Japanese Markets*, 5, (1) 29-44.

[50] Yonozawa Y. and K. Miyake (1998) "The Structure of the Japanese Stock Market," *Financial Engineering and the Japanese Markets*, 5 (1) 1-28.

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Table A

	Hong Kong	**Stock Exchange**		**Model 1**			
Response Variable		**dretwd**					
1980	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00627	-0.00431	-0.00155	0.00008361	-0.00292	10.21	1.848
p-value	0.0001	0.0001	0.0645	0.9205	0.0006	0.0001	
1981	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.0035	0.00181	0.00828	0.00516	0.01227	69.82	1.935
p-value	0.0001	0.0311	0.0001	0.0001	0.0001	0.0001	
1982	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00745	0.00568	0.01103	0.00394	0.01008	69.73	1.98
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
1983	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00317	0.00449	0.00496	0.00603	0.00787	24.32	1.977
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
1984	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00302	-0.00035991	-0.0014	0.00003534	-0.00113	1.6	1.973
p-value	0.0001	0.623	0.0598	0.9615	0.1198	0.1713	
1985	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.003	-0.00324	-0.00072558	0.00241	-0.00163	23.65	1.89
p-value	0.0001	0.0001	0.2427	0.0001	0.008	0.0001	
1986	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00309	0.00053636	0.00009491	0.00151	0.00118	2.78	1.754
p-value	0.0001	0.3426	0.8676	0.0077	0.0382	0.0254	
1987	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00564	0.00808	0.01357	0.00667	0.0113	101.77	1.525
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
1988	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00015437	0.00199	0.004	-0.00034514	0.00393	66.62	1.808
p-value	0.5582	0.0001	0.0001	0.3417	0.0001	0.0001	
1989	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00354	0.00876	0.0051	0.00468	0.00572	90.68	1.972
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

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1990	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00254	0.0058	0.00465	0.00264	0.00541	64.57	1.755
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1991	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00286	0.00333	0.00402	0.00571	0.00717	172.76	1.941
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1992	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00037654	0.00159	0.00312	-0.0009954	0.00529	119.58	1.83
p-value	0.1078	0.0001	0.0001	0.0021	0.0001	0.0001	

1993	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00156	0.00125	0.00338	0.00159	0.00109	28.52	1.877
p-value	0.0001	0.0001	0.0001	0.0001	0.0011	0.0001	

1994	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00277	0.00177	0.00124	-0.00056149	0.00264	39.37	1.938
p-value	0.0001	0.0001	0.0001	0.0584	0.0001	0.0001	

1995	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00088878	0.00203	0.00247	0.00121	0.0026	23.53	1.983
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1996	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00184	0.00176	0.00052103	-0.0000534	0.00045651	10.09	1.981
p-value	0.0001	0.0001	0.1179	0.8731	0.1684	0.0001	

1997	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00196	-0.00822	0.00213	-0.00706	0.00523	356.42	1.943
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1998	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00236	0.00202	0.00441	-0.0011	0.00383	37.62	1.829
p-value	0.0001	0.0002	0.0001	0.0447	0.0001	0.0001	

1999	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00422	-0.00271	-0.00010467	0.00467	-0.0021	57.92	1.912
p-value	0.0001	0.0001	0.8454	0.0001	0.0001	0.0001	

2000	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00172	0.00292	0.00106	-0.00095011	0.00766	75.48	1.963
p-value	0.0001	0.0001	0.0569	0.0878	0.0001	0.0001	

2001	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00084906	0.00152	-0.00112	0.00000279	0.00836	3.25	2.001
p-value	0.6972	0.6187	0.7131	0.9993	0.0059	0.0114	

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2002	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00096917	0.0018	0.00024907	0.00361	0.0009087	28.72	2.095
p-value	0.0005	0.0001	0.5234	0.0001	0.0193	0.0001	

F-value= F-statistic

P-value= probability of a Type I Error

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Table B

Hong Kong Stock Exchange Model 2

Response Variable **dretwd**

1980	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00369	-0.00429	-0.00146	0.00017823	-0.00284	1.77E-08	-8.53E-06	59.28	1.858
p-value	0.0001	0.0001	0.0812	0.8303	0.0007	0.0001	0.5508	0.0001	

1981	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00458	0.00183	0.00848	0.00514	0.01228	1.61E-09	9.30E-07	57.3	1.934
p-value	0.0001	0.029	0.0001	0.0001	0.0001	0.0764	0.0001	0.0001	

1982	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00821	0.00561	0.01117	0.00384	0.01005	4.38E-09	2.84E-07	54.24	1.982
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.1551	0.0001	

1983	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00458	0.00451	0.00528	0.00586	0.00782	7.00E-09	5.87E-07	31.37	1.98
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0218	0.0001	

1984	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00175	-0.00031114	-0.00115	-0.00002964	-0.00117	4.98E-09	2.49E-07	20.94	1.976
p-value	0.001	0.6699	0.1195	0.9676	0.1072	0.0001	0.1523	0.0001	

1985	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00177	-0.00322	-0.0005098	0.00226	-0.00174	4.96E-09	8.76E-08	49.06	1.894
p-value	0.0001	0.0001	0.4099	0.0003	0.0043	0.0001	0.3871	0.0001	

1986	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.0023	0.00056266	0.00011252	0.00146	0.00114	1.61E-09	-1.09E-07	47.24	1.763
p-value	0.0001	0.3175	0.8427	0.0097	0.0445	0.0001	0.0001	0.0001	

1987	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.0062	0.00813	0.0136	0.00673	0.01134	3.47E-10	-1.75E-08	85.01	1.525
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.1353	0.0001	

1988	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00074643	0.00207	0.00401	-0.0003484	0.00391	4.46E-10	7.16E-08	105.97	1.808
p-value	0.0053	0.0001	0.0001	0.3355	0.0001	0.0001	0.0001	0.0001	

1989	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.0041	0.0088	0.00515	0.00473	0.00573	2.17E-10	2.41E-08	85.09	1.972
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0292	0.0001	

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1990	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00385	0.00567	0.00452	0.00254	0.00529	5.38E-11	2.72E-07	184.01	1.757
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1991	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00356	0.00336	0.00405	0.00571	0.00715	1.96E-10	6.81E-08	199.25	1.944
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1992	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.0013	0.00157	0.00308	-0.0009985	0.00521	4.28E-10	9.68E-09	230.92	1.842
p-value	0.0001	0.0001	0.0001	0.0019	0.0001	0.0001	0.0052	0.0001	

1993	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00041585	0.00121	0.00332	0.00152	0.00103	1.73E-10	6.25E-08	295.84	1.884
p-value	0.0825	0.0002	0.0001	0.0001	0.0018	0.0001	0.0001	0.0001	

1994	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00335	0.00173	0.00117	-0.0006249	0.00256	3.44E-10	5.53E-09	112.59	1.939
p-value	0.0001	0.0001	0.0001	0.0347	0.0001	0.0001	0.0241	0.0001	

1995	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00212	0.00196	0.00237	0.00108	0.00246	7.74E-10	1.14E-09	242.28	1.985
p-value	0.0001	0.0001	0.0001	0.0005	0.0001	0.0001	0.4986	0.0001	

1996	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00086087	0.00175	0.00049901	-0.0000567	0.000441	3.33E-10	-3.48E-09	273.23	1.989
p-value	0.0003	0.0001	0.1313	0.8643	0.18	0.0001	0.0645	0.0001	

1997	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00011145	-0.00827	0.00207	-0.00726	0.00505	2.27E-10	9.06E-09	783.51	1.952
p-value	0.7223	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1998	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00308	0.00196	0.00432	-0.00117	0.00377	1.39E-10	4.82E-09	95.34	1.828
p-value	0.0001	0.0004	0.0001	0.0334	0.0001	0.0001	0.0009	0.0001	

1999	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00271	-0.00291	-0.00029267	0.00442	-0.0022	1.46E-10	2.35E-08	297.03	1.915
p-value	0.0001	0.0001	0.5831	0.0001	0.0001	0.0001	0.0001	0.0001	

2000	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00279	0.0029	0.00104	-0.0009168	0.00765	6.03E-11	1.19E-08	186.09	1.962
p-value	0.0001	0.0001	0.0607	0.0985	0.0001	0.0001	0.0001	0.0001	

2001	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00029072	0.00146	-0.00117	-0.00005795	0.00832	7.08E-11	-2.51E-09	3.59	2.001
p-value	0.8948	0.6331	0.7001	0.9848	0.0061	0.0034	0.8599	0.0014	

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2002	Intercept	W2	W3	W4	W5	trdvol	trdval	F-value	DW
Estimate	-0.00129	0.00176	0.0002071	0.00358	0.00088094	3.91E-11	4.59E-09	56.31	2.094
p-value	0.0001	0.0001	0.5954	0.0001	0.0232	0.0001	0.036	0.0001	

F-value= F-statistic

P-value= probability of a Type I Error

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Table C

Tokyo, Japan Stock Exchange Model 1

1975	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00056096	-0.00029235	0.00103	0.00078781	0.00109	0.00219	45.43	2.162
p-value	0.0001	0.0951	0.0001	0.0001	0.0001	0.0001	0.0001	
1976	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00109	-0.0004589	0.00286	-0.00065123	0.00038465	0.00048265	115.39	2.155
p-value	0.0001	0.0054	0.0001	0.0001	0.0193	0.007	0.0001	
1977	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00052591	-0.00104	0.00156	-0.00076575	0.00079302	0.00048221	85.89	2.147
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0033	0.0001	
1978	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00142	-0.00083059	0.00203	0.00062269	0.0012	0.00116	86.3	2.069
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
1979	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.0000198	-0.00089007	0.00203	-0.00009157	0.00025689	0.00114	114.63	2.111
p-value	0.8416	0.0001	0.0001	0.5007	0.0586	0.0001	0.0001	
1980	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00015653	-0.00055877	0.00183	0.00047171	0.00106	0.00092115	78.08	2.117
p-value	0.1198	0.0001	0.0001	0.0006	0.0001	0.0001	0.0001	
1981	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00070254	-0.00149	0.000927	-0.00087081	-0.00001803	0.00041066	85.51	2.069
p-value	0.0001	0.0001	0.0001	0.0001	0.8908	0.0044	0.0001	
1982	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00092958	-0.00133	0.00073978	-0.00107	-0.00087473	0.00040904	76.89	2.148
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0055	0.0001	
1983	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00156	-0.00099349	0.00082942	0.00035512	0.00011891	0.00053779	41.18	2.101
p-value	0.0001	0.0001	0.0001	0.0125	0.4029	0.0004	0.0001	
1984	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00127	-0.00105	0.00168	-0.00117	0.00031165	0.0006698	106.18	2.058
p-value	0.0001	0.0001	0.0001	0.0001	0.0375	0.0001	0.0001	
1985	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00129	-0.00169	0.00116	-0.00015542	-0.00038447	0.00064552	93.94	2.057
p-value	0.0001	0.0001	0.0001	0.2893	0.0082	0.0001	0.0001	

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1986	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00174	-0.00231	-0.00014624	-0.00026056	0.00001676	0.00102	95.94	2.021
p-value	0.0001	0.0001	0.3319	0.0823	0.9118	0.0001	0.0001	

1987	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	-0.00122	0.00039688	0.00423	0.00436	0.00442	0.0043	331.66	2.067
p-value	0.0001	0.0153	0.0001	0.0001	0.0001	0.0001	0.0001	

1988	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00159	-0.00039192	0.00122	-0.00064312	-0.00082039	-0.00008943	65.58	2.065
p-value	0.0001	0.002	0.0001	0.0001	0.0001	0.5585	0.0001	

1989	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**F-value**	**DW**
Estimate	0.00114	0.00127	0.00148	0.00044866	0.00071206	0.00601	61.17	2.094
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1990	**Intercept**	**W2**	**W3**	**W4**	**W5**	**No Saturday**	**F-value**	**DW**
Estimate	-0.00062522	0.00017521	0.00089793	-0.00196	-0.00060759	**Opening**	83.54	1.86
p-value	0.0001	0.3056	0.0001	0.0001	0.0004	**Since 1990**	0.0001	

1991	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00261	0.00314	0.00296	0.00457	0.00425	349.27	1.959
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1992	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.0023	-0.00097529	-0.00082468	0.00622	0.00325	859.62	1.885
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1993	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00222	0.00195	0.00239	0.00616	0.00454	707.62	1.955
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1994	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.0000012	0.00122	0.00118	0.00101	0.00106	43.92	2.095
p-value	0.9875	0.0001	0.0001	0.0001	0.0001	0.0001	

1995	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00141	0.00273	0.00189	0.0022	0.00171	115.55	2.046
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1996	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00167	0.00223	0.00177	0.00109	0.00194	119.07	2.173
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

1997	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00172	0.00166	0.00036785	-0.00134	-0.00221	163.25	2.066
p-value	0.0001	0.0001	0.0289	0.0001	0.0001	0.0001	

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1998	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00304	-0.00185	0.00021375	-0.00548	-0.00308	297.39	2.086
p-value	0.0001	0.0001	0.2732	0.0001	0.0001	0.001	

1999	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00255	-0.00211	-0.0019	-0.00142	-0.00154	43.89	2.11
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

2000	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00237	-0.00253	-0.00239	-0.00453	-0.00081275	185.04	2.144
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

2001	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00313	0.00433	0.00222	0.00463	0.00458	316.87	2.131
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

2002	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	-0.00044512	-0.00117	-0.00044783	0.002	0.00194	101.6	2.071
p-value	0.0039	0.0001	0.0326	0.0001	0.0001	0.0001	

2003	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00351	-0.00208	-0.00136	-0.00307	-0.00106	113.68	1.986
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

2004	**Intercept**	**W2**	**W3**	**W4**	**W5**	**F-value**	**DW**
Estimate	0.00259	-0.00238	0.00058954	-0.00261	0.02959	0.98	1.404
p-value	0.8583	0.9061	0.9768	0.8976	0.1405	0.419	2

F-value= F-statistic

P-value= probability of a Type I Error

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Table D

Tokyo, Japan **Stock Exchange** **Model 2**

1975	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00022919	-0.00037326	0.00090082	0.00059564	0.00084519	0.00227	2.68E-09	0.00000617	538.13	2.169
p-value	0.0702	0.0319	0.0001	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001	
1976	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.0003223	-0.00053219	0.00266	-0.00076512	0.00022835	0.00057516	1.00E-09	0.00000777	738.91	2.163
p-value	0.0064	0.0011	0.0001	0.0001	0.1616	0.0012	0.0001	0.0001	0.0001	
1977	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00010947	-0.00113	0.00139	-0.00092444	0.00059498	0.00054515	1.81E-09	0.00000439	686.5	2.155
p-value	0.3136	0.0001	0.0001	0.0001	0.0001	0.0008	0.0001	0.0001	0.0001	
1978	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00050205	-0.00094938	0.00178	0.00045806	0.00094857	0.00125	1.29E-10	0.00001015	1019.18	2.078
p-value	0.0001	0.0001	0.0001	0.0024	0.0001	0.0001	0.0195	0.0001	0.0001	
1979	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00041695	-0.00093384	0.00191	-0.00018192	0.0001548	0.00118	1.02E-09	0.00000173	689.32	2.121
p-value	0.0001	0.0001	0.0001	0.178	0.2513	0.0001	0.0001	0.0001	0.0001	
1980	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00044864	-0.00062527	0.00168	0.00035358	0.00092364	0.001	1.00E-10	0.00000534	915.99	2.13
p-value	0.0001	0.0001	0.0001	0.0095	0.0001	0.0001	0.0041	0.0001	0.0001	
1981	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00037019	-0.00155	0.00081635	-0.00094223	-0.0001114	0.00046107	1.21E-11	0.00000221	488.83	2.076
p-value	0.0001	0.0001	0.0001	0.0001	0.3936	0.0013	0.6466	0.0001	0.0001	
1982	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00055702	-0.00138	0.00062932	-0.00117	-0.001	0.00042976	1.05E-09	0.00000132	491.83	2.156
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0034	0.0001	0.0001	0.0001	
1983	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00092875	-0.00109	0.00069704	0.00020148	-0.00005403	0.00064988	1.01E-09	0.00000235	787.05	2.109
p-value	0.0001	0.0001	0.0001	0.1531	0.7016	0.0001	0.0001	0.0001	0.0001	
1984	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00051804	-0.00112	0.00143	-0.00133	0.00008745	0.00080932	1.41E-09	0.0000021	908.09	2.068
p-value	0.0001	0.0001	0.0001	0.0001	0.5561	0.0001	0.0001	0.0001	0.0001	
1985	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00072077	-0.00177	0.00096677	-0.00031648	-0.00052877	0.00079415	7.83E-10	0.0000017	747.59	2.066
p-value	0.0001	0.0001	0.0001	0.0298	0.0003	0.0001	0.0001	0.0001	0.0001	

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1986	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00133	-0.00237	-0.00028723	-0.00039079	-0.00012833	0.0011	1.77E-10	8.68E-07	599.76	2.026
p-value	0.0001	0.0001	0.0554	0.0088	0.3941	0.0001	0.0001	0.0001	0.0001	

1987	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00139	0.0003579	0.00416	0.00429	0.00435	0.00432	3.09E-10	1.76E-09	423.94	2.07
p-value	0.0001	0.0285	0.0001	0.0001	0.0001	0.0001	0.0001	0.003	0.0001	

1988	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.0014	-0.00043958	0.00112	-0.00071613	-0.00090327	-0.00005312	3.10E-10	2.02E-09	337.82	2.069
p-value	0.0001	0.0005	0.0001	0.0001	0.0001	0.7275	0.0001	0.0252	0.0001	

1989	**Intercept**	**W2**	**W3**	**W4**	**W5**	**W6**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00065224	0.00113	0.0013	0.00031144	0.00058437	0.00581	9.73E-10	2.99E-09	810.66	2.102
p-value	0.0001	0.0001	0.0001	0.0061	0.0001	0.0001	0.0001	0.0177	0.0001	

1990	**Intercept**	**W2**	**W3**	**W4**	**W5**	**No Saturday**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00124	0.00009681	0.00075751	-0.0021	-0.0007726	**Opening**	2.19E-10	0.00000121	442.18	1.862
p-value	0.0001	0.5701	0.0001	0.0001	0.0001	**Since 1990**	0.0011	0.0001	0.0001	

1991	**Intercept**	**W2**	**W3**	**W4**	**W5**		**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00323	0.00301	0.00282	0.00443	0.00405		8.96E-10	0.00000154	815.57	1.964
p-value	0.0001	0.0001	0.0001	0.0001	0.0001		0.0001	0.0001	0.0001	

1992	**Intercept**	**W2**	**W3**	**W4**	**W5**		**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.0028	-0.00103	-0.00094443	0.00604	0.00302		1.99E-09	0.00000115	797.52	1.89
p-value	0.0001	0.0001	0.0001	0.0001	0.0001		0.0001	0.0001	0.0001	

1993	**Intercept**	**W2**	**W3**	**W4**	**W5**		**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00289	0.00186	0.00225	0.00601	0.00425		2.73E-09	6.01E-07	1051.65	1.96
p-value	0.0001	0.0001	0.0001	0.0001	0.0001		0.0001	0.0001	0.0001	

1994	**Intercept**	**W2**	**W3**	**W4**	**W5**		**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00052313	0.00116	0.00106	0.00090038	0.00092662		2.35E-09	3.35E-07	446.08	2.098
p-value	0.0001	0.0001	0.0001	0.0001	0.0001		0.0001	0.0001	0.0001	

1995	**Intercept**	**W2**	**W3**	**W4**	**W5**		**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00198	0.0027	0.0018	0.0021	0.00154		1.70E-09	0.00000108	496.59	2.053
p-value	0.0001	0.0001	0.0001	0.0001	0.0001		0.0001	0.0001	0.0001	

1996	**Intercept**	**W2**	**W3**	**W4**	**W5**		**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00226	0.00213	0.00161	0.00094099	0.00169		2.39E-09	4.85E-07	618.85	2.18
p-value	0.0001	0.0001	0.0001	0.0001	0.0001		0.0001	0.0001	0.0001	

1997	**Intercept**	**W2**	**W3**	**W4**	**W5**		**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00183	0.00164	0.0003366	-0.00137	-0.00224		-9.80E-10	0.00000144	254.55	2.064
p-value	0.0001	0.0001	0.0454	0.0001	0.0001		0.0001	0.0001	0.0001	

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1998	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00271	-0.00189	0.00015418	-0.00554	-0.00316	1.46E-09	-5.54E-08	281.38	2.088
p-value	0.0001	0.0001	0.4291	0.0001	0.0001	0.0001	0.5189	0.0001	

1999	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00173	-0.00218	-0.00201	-0.00157	-0.0018	2.23E-09	4.59E-07	631.8	2.117
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

2000	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.00157	-0.00254	-0.00242	-0.00457	-0.00093556	2.46E-09	-4.78E-08	579.11	2.148
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0146	0.0001	

2001	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00345	0.00431	0.00218	0.00458	0.0045	7.34E-10	1.72E-07	326.46	2.13
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

2002	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00067945	-0.00118	-0.00046115	0.00198	0.0019	5.08E-10	1.40E-07	102.31	2.071
p-value	0.0001	0.0001	0.0278	0.0001	0.0001	0.0001	0.0027	0.0001	

2003	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	0.003	-0.00212	-0.00141	-0.00311	-0.00112	7.67E-10	2.35E-07	550.49	1.986
p-value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	

2004	**Intercept**	**W2**	**W3**	**W4**	**W5**	**trdvol**	**trdval**	**F-value**	**DW**
Estimate	-0.00175	-0.0025	0.00031091	-0.00288	0.02903	-7.18E-10	0.00000859	2.97	2
p-value	0.904	0.9014	0.9878	0.8871	0.1482	0.6981	0.0003	0.0068	

F-value= F-statistic
P-value= probability of an Error or rejecting a true null hypothesis

