INTERDEPENDENCY BETWEEN ISTANBUL STOCK EXCHANGE AND NEWYORK STOCK EXCHANGE

M.B.A. THESIS

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ANKARA, JUNE 1994

INTERDEPENDENCY BETWEEN İSTANBUL STOCK EXCHANGE AND NEWYORK STOCK EXCHANGE

A THESIS
SUBMITTED TO THE DEPARTMENT OF MANAGEMENT
AND THE GRADUATE SCHOOL OF BUSINESS ADMINISTRATION
OF BILKENT UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF BUSINESS ADMINISTRATION

BY

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JUNE 1994

I certify that I have read this thesis and in my opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Business Administration.

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ABSTRACT

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Aslı Bökesoy

M.B.A.

Supervisor: Assoc. Prof. Gülnur Muradoğlu
June 1994, 63 Pages

Globalization of world stock markets and international diversification of securities portfolios are topics that are widely discussed in the recent years. Many markets were analyzed for interdependencies in the literature. This study tests the interdependence between Istanbul Stock Exchange and NewYork Stock Exchange for the period between April 1992 and December 1993 using daily return indexes. Results of the tests showed that stock price indexes in both markets were nonstationary and that they are interdependent. Therefore, they point out the possibility that the price movements in Istanbul Stock Exchange are affected from the price movements in NewYork Stock Exchange.

ÖZET

İSTANBUL MENKUL KIYMETLER BORSASI VE NEWYORK MENKUL KIYMETLER BORSASI ARASINDAKI ETKİLEŞİM

Aslı Bökesoy

M.B.A.

Danışman: Doç. Dr. Gülnur Muradoğlu
Haziran 1994, 63 Sayfa

Dünya sermaye piyasalarının küreselleşmesi ve uluslararası portfolyo yönetimi son yıllarda sıkça tartılışan konulardandır. Literatürde, pek çok sermaye piyasası etkileşimleri açısından incelenmiştir. Bu çalışmada, İstanbul menkul kıymetler borsası ve NewYork menkul kıymetler borsası Nisan 1992 den Aralık 1993 e kadar günlük indeksler kullanılarak karşılaştırılmıştır. Test sonuçları göstermektedir ki, iki market birbirlerinden etkilenmektedir. Bu sebepten dolayı, sonuç olarak diyebiliriz ki, NewYork menkul kıymetler borsasındaki hareketler İstanbul menkul kıymetler borsasındaki hareketleri etkiler.

ACKNOWLEDGEMENTS

I would like express my gratitude to Assoc. Prof. Gülnur Muradoğlu for her guidance, support and encouragement for the preparation of this thesis. I would like to thank to Assist. Prof. Ayşe Yüce for her corrections, guidance and suggestions. I am grateful to Demet Çetin and Ercüment Bölükbaş and to all my friends for their help and support. Finally, I would like to express my special thanks to my family especially to my mother for their support and encouragement during my M.B.A. education and during this study.

TABLE OF CONTENTS

1. INTRODUCTION

International diversification of securities portfolios and globalization of securities markets are topics that are discussed and that received increased attention in recent years. Decontrol of capital flows, introduction of flexible exchange rates, advanced communications technology, computerized trading systems, relaxation of foreign investment ceilings, realized benefits of diversification of capital sources like increased demand and worldwide contacts advantageous for expansion of businesses are some of the factors which have encouraged the globalization of world stock markets.

The benefits of international diversification have been of increasing interest to both investment professionals and academicians. Many studies showed that interdependence of world markets have increased in 1980's. Comovements of stock markets in the United States, Europe, Japan and some Asian countries have been studied in the literature and the correlation in the movements of the stock prices in these markets were tested. On the other hand, the number of foreign investors in worldwide equity markets have also increased from one in sixteen in 1979 to one in seven in 1991 (Halpern,1993).

The purpose of this thesis is to analyse the interdependence between Istanbul Stock Exchange and NewYork Stock Exchange for the period between April 1992 and December 1993. Istanbul Stock Exchange, after it has been reorganized in 1986, attracted an increasing attention from domestic and foreign investors and trading volume of securities as well as initial security issues increased sharply since then. The return on Istanbul Stock Exchange (ISE) also increased significantly reflecting the increase on the demand side. Since ISE is a young and developing market, such an analysis will serve as a tool for comparing the characteristics of the two markets besides helping to clarify the diversification benefits of investing in both markets. This study will also provide

opportunity for investors in forecasting movements in one market by analysing movements in the other.

In this study, ISE indices will be analysed for dependence on NewYork Stock Exchange (NYSE) indices. The testing procedure is as follows, first the regression analysis is performed for calculation of correlation coefficients, then two series are tested for nonstationarity using unit root tests and finally an interdependence test is performed for analysis of a possible common stochastic trend between the two indices.

As a result of this study, if an interdependence is found between ISE and NYSE, this will show the possibility of predicting the future stock prices of one market by using the stock prices of the other. On the contrary, if results of the study indicate no interdependence, this result will justify the chance for effective international diversification. An interdependence study will therefore be a useful tool for both domestic and international investors.

2. LITERATURE REVIEW

Globalization of world stock markets, interdependence of the movements in worldwide markets and opportunities for international diversification have been topics which have attracted increasing attention from academicians in last ten years.

The studies concerning the globalization of world markets can be divided into three categories. The first category includes papers discussing the reasons for globalization. An example is Halpern (1993), who discussed the factors that encouraged the integration of worldwide markets. These factors included relaxation in control of international capital flows, recognition of diversification benefits of capital sources by the issuers and increasing number of international investors taking advantage of world capital market opportunities. Besides explaining these factors, Halpern (1993) stated that the integration of world economies and stock ownership have lead to increased correlations across markets which enabled profitable arbitrage opportunities when price movements were large enough to compensate for the transaction costs.

The second group of studies test the possible existance of the correlation or comovements between several markets using many different test procedures. Regression and correlation tests and analysis of random walk behaviour are mainly used by these authors (Jean and Chiang, 1991).

The third group of studies are the ones who apply further tests on comovements of markets. An example is Kaplanis (1988), who examined the stability of the comovement measures of international stock index returns. The author studied ten stock markets and found that the correlation matrix of the stock returns of these markets was stable over

time, while the covariance matrix was less stable. Therefore he examined alternative models for improving covariance forecasts despite the unstable covariance matrix.

In the literature, the United States stock market has been a major market for analysis of interdependence. It has been studied by all the authors who analysed co-integration of stock markets. Many studies have shown that the U.S. market had a significant influence on other markets and that it played a leading role. Some of the studies analysing the U.S. market are summarized below.

The stock market crash of 1987 has been a significant evidence for globalization of stock markets since it showed how close the stock markets were linked together. Price declines in US market which were reflecting reactions to information about the trade deficit , prompted similar declines in markets around the world and as a result a global crash took place. As an article in Wall Street Journal of November 1987 stated, "When New York sneezes, Tokyo and London catch a cold". Many authors including Jean and Furstenberg (1990) and Bertea and Mayer (1990) studied stock markets around the crash.

Jean and Furstenberg (1990), focused on world's four largest stock markets, New York, London, Frankfurt and Tokyo for the period of 1986 through 1988 in order to analyze the effects of the stock market crash of October 1987. They used daily data and set up a four variable vector auto regression (VAR) system for investigating the interdependence of these markets. They concluded that the degree of international co-movements in stock price indices had increased significantly after the crash.

Bertera and Mayer (1990) analyzed the stock price indices and the structure 23 stock markets including Australia, Hong Kong, Malaysia, Mexico, Singapore, South Africa, New Zealand, Japan, United States and some European countries around the crash of

1987. They compared the size, trading volume and some trade characteristics and analyzed the interrelations between these markets. Their analysis also showed that the correlations between all regions increased and remained higher after the crash.

Mathur and Subrahmanyam (1990), discussed interdependencies between the US and Nordic stock markets. They used monthly stock price indices for the period between 1974 to 1985 and examined the data using the concept of Granger causality. They concluded that the United States market affected only one of the four Nordic markets-in Denmark. However, a high interdependence was observed between the Nordic markets and they concluded that it was possible to earn extra returns by anticipating stock price changes in one market by observing the changes in others.

Becker, Finnerty and Gupta (1990) studied the relation between United States and Japanese stock markets using daily data from 1985 to 1988. Because Tokyo is 14 hours ahead of New York, there is about three hour difference between the close of New York stock exchange and the open of Tokyo stock exchange. Regression and correlation results showed that the movements in the United States strongly influenced the Japanese market whereas Japan market has only a slight effect on New York stock exchange. However, profitable trading on Japanese market based on the movements on New York stock exchange was not possible due to the high trading costs in Japan.

Jean and Chiang (1991) analyzed daily stock price indices in the New York, London, Tokyo and Frankfurt stock exchanges during the period from 1975 to 1990. They first tested the hyphotesis that the stock price indices follow unit root processes by the testing procedure proposed by Dickey and Fuller (1981). The test results showed that stock prices for all four markets were nonstationary. Then, they analyzed the common stochastic trends by multivariate co-integration tests. The results showed a common

stochastic trend in the system. They also found evidence for greater globalization of world stock markets during the 1980's and concluded that the globalization of world stock markets is an ongoing process.

Chan, Gup and Pan (1992) analyzed stock prices in the US and major Asian countries (Hong Kong, South Korea, Singapore, Taiwan) using daily and weekly data. First they tested pairwise correlation among these markets. The obtained correlation coefficients were low indicating that international diversification among these markets could be effective. Second, to test for the random walk, they applied Perron-Phillips unit root tests. The null hyphoteses for unit roots in all markets were not rejected indicating the random walk behaviour of indices. Lastly, they applied co-integration tests and no evidence for co-integration between these markets was found. They concluded that international diversification among the tested markets will be effective.

In this thesis, stock price indices of ISE and NYSE are compared. Regression analysis, Dickey-Fuller (1981) unit root tests and Durbin-Watson interdependence test are used for the analysis of a possible existance of a common trend between the two stock exchanges. The results of this study will be useful because any indication of interdedendence with the U.S. market will show that ISE acting on global basis since U.S. market is the main market influencing many other markets such as many European markets and Tokyo market.

3. DATA AND METHODOLOGY

3.1. Data:

Daily index data for NewYork Stock Exchange Dow Jones index and Istanbul Stock Exchange Composite index were examined for the period between April 1992 and December 1993. Some daily observations were deleted because of different holiday and trading day schedules in Turkey and U.S.. After matching the daily observations, we had 382 observations in both of the markets. The graphs of both indexes are given in Appendix 1.

3.2. Testing Procedure For Analysing Interdependence

For globalized world stock markets, the national stock prices are expected to have a common trend. In integrated markets, market prices are so closely linked that movements in prices in one national market immediately affect stock prices in other markets. This produces comovements of national stock prices through efficient information sharing and free accessibility to markets by domestic as well as foreign investors.

In this study, the testing procedure for analysis of a possible common trend between ISE and NYSE is as follows, first the two stock indices are regressed for analysis of interdependence. Then Dickey-Fuller unit root test is applied for both stock series and lastly the two series are tested for autocorrelation.

The reasoning behind this procedure is simple, regressing one nonstationary series against another can lead to spurious results as conventional significance tests may tend to indicate a relationship between the variables when in fact none exists. Ordinary Least Squares method would not yield a consistent parameter estimator in this case because a nonstationary series will not satisfy the assumptions of linear regression as it does not have a finite variance. This is the reason why testing for nonstationarity is important. If unit root tests fail to reject the hypothesis of a nonstationary behaviour, further tests for analysing interdependence are necessary to investigate the possible common stochastic trend between the two series.

3.3 Methodology

3.3.1 Linear Regression Model (testing for interdependence):

Linear regression model is as follows;

$Y_i = B_0 + B_1 X_i + e_i$

where

Y_i :dependent variable, ISE Composite index

X_i :independent variable, NYSE Dow Jones index

B_0 : intercept

B_1 :slope of the regression line

e_i :error term

i :time for t=0,...,382

The assumptions for regression are as follows;

- The mean of the probability distribution of e is 0.
- Variance of the probability distribution of e is constant for all values of the independent variable, X.
- Probability distribution of e is normal.

- Errors associated with two different observations are independent.

Assessing the usefulness of the linear regression model is as follows, The null hypothesis that the Dow Jones index provides no information for the prediction of ISE Composite index should be tested against the alternative hyphotesis that the two variables are at least linearly related:

H_0: B_1 is equal to zero

H_a: B_1 is different from zero

3.3.2. Testing For Nonstationarity:

Unit root tests proposed by David Dickey (1981) and Wayne Fuller (1981) are mainly used for testing for nonstationarity. The model used here is as follows, let Y_t, which is growing over time, be described by the following equation;

$$Y_t = A + Bt + PY_{t-1} + e_t$$

where;

Y_t : market return index

A : drift variable

B : trend variable

t : time for t=0,...,380

P : coefficient

e_t : error term

There are two possible explanations for explaining the growing characteristic of Y_t, one possibility is that growth is because it has a positive trend (B>0) and would be stationary after detrending (i.e., P<1). In this case, Y_t could be used in a regression. Another possibility is that Y_t has been growing because it is a nonstationary series with a positive drift (i.e., A>0, B=0, P=1). In this case, one would like to work with delta Y_t.

Dickey and Fuller (1981) generated statistics for a F-test in order to test for nonstationarity. That is, for testing the hypothesis that B=0 and P=1. The test procedure is as follows (Kendall, 1990);

Let Y_t be described by the following equation;

$$Y_t = A + Bt + PY_{t-1} + L_1 dY_{t-1} + e_t$$

Where

Y_t : market return index

A : drift

B : coefficient for trend

t : time for t=0,...,380

P : coefficient

e_t : error term

dY_{t-1} : $Y_{t-1} - Y_{t-2}$

The unrestricted equation;

$$Y_t - Y_{t-1} = A + Bt + (P-1)Y_{t-1} + L_1 dY_{t-1}$$

and the restricted equation;

$Y_t - Y_{t-1} = A + L_1 dY_{t-1}$

should be runned and the below F ratio should be calculated;

$F = (N-k)(ESS_R - ESS_{UR})/q(ESS_{UR})$

Where,

N : number of observations

k : number of estimated parameters in unrestricted regression

q : number of parameter restrictions

ESS : sum of squared residuals

Then, F distributions calculated by Dickey and Fuller (1981) are used for testing the hyphotesis of a nonstationarity(i.e., (A,B,P) = (A,0,1)).

3.3.3. Testing For Autocorrelation:

Durbin-Watson statistic is useful for performing interdependence regression. This statistics tests the following hypothesis;

H_0: No first order autocorrelation of residuals

H_a: Positive first order autocorrelation of residuals

by the use of d-statistic. This statistic is given by the formula:

$$d = \frac{\sum_{t=2}^{n} E(Rt - Rt-1)^2}{\sum_{t=2}^{n} E(Rt)^2}$$

Where;

R_t is defined as $R_t = Y_t - \ddot{Y}_t$

n : the number of observations,

$(R_t - R_{t-1})$ represent the difference between a pair of successive time series residuals.

4. RESULTS

4.1. Linear Regression (Interdependence analysis):

Regression results are tabulated below, where ISE is the dependent variable ie. Composite stock index for Istanbul Stock Exchange and NYSE is the independent variable ie. Dow Jones stock index. The resulting *t* statistic values are so large that the null hypothesis that B_1 (Slope of the line) is equal to zero is rejected and it is concluded that two variables are at least linearly related.

Table 1 (Results of linear regression)

Equation of the line: ISE = -84244.87 + 2.681NYSE

	INTERCEPT	NYSE
Coefficient	-84244.87	2.681
t Statistic	-39.33	42.81
R Square	*0.8281*	
F Value	*1832.52*	

4.2. Unit root tests:

After running Dickey-Fuller unit root tests on ISE and NYSE indexes, (see Appendix 2) by first estimating the unrestricted regression and than the restricted equation, the results obtained are summarized in the table below;

Table 2 (Summary of Dickey-Fuller tests)

		A	B	(P-1)	L1
NYSE					
Unrestricted	Coefficient	1240	0.495	0.039	-0.027
	t Statistic	*2.64*	*2.57*	*-2.64*	*-0.52*
Restricted	Coefficient	13.2			-0.046
	t Statistic	*1.14*			*-0.9*
ISE					
Unrestricted	Coefficient	-9.2	0.534	-0.008	0.118
	t Statistic	*-0.38*	*2.18*	*-1.34*	*2.31*
Restricted	Coefficient	30.4			0.129
	t Statistic	*2.53*			*2.53*

In each case, there were 380 observations. The F ratio defined by Dickey and Fuller (1981) to test for unit roots is then calculated by using the error sum of squares (ESS) using the formula given in methodology section. For NYSE the F ratio is (380-4)(19093630-18726486)/(2)(18726486)=3.78 and for ISE it is (380-4)(20330316-19973734)/(2)(19973734)=3.35.

Table 3 (Summary of F Ratio calculations)

	ESS	F Ratio
NYSE		
Unrestricted	18726486	
Restricted	19093630	*3.78*
ISE		
Unrestricted	19973734	
Restricted	20330316	*3.35*

Comparing these values with the tabulated distribution for F values (see Appendix 3), it is apparent that we cannot reject the hypothesis of a nonstationarity for none of the markets even at the 10 percent level. Therefore, we can conclude that the market indexes of ISE and NYSE are consistent with the nonstationarity hypothesis during the period between April 1992 and December 1993.

These findings necessitate further interdependence tests for analysis of the interdependence between NYSE and ISE since market indexes series are nonstationary in both markets. The regression test performed in the first step of the interdependence analysis might not be accurate as regressing one nonstationary series against another could lead to spurious results. Therefore, Durbin-Watson test was performed for analysis of interdependence between the two markets.

4.3. Durbin Watson d Test:

First, residuals were calculated and the autocorrelation of neighboring residuals (time periods t and t+1) was tested using d-statistics in 100 day periods (App.4).

The value of d should always fall in the interval from 0 to 4. The interpretations of the values of d are as follows;

i- If the residuals are uncorrelated, then d=2

ii- If the residuals are positively autocorrelated, then d<2 and if the autocorrelation is very strong, then d=0

iii- If the residuals are negatively autocorrelated, then, d>2 and if the autocorrelation is very strong then, d=4

The results obtained for ISE and NYSE are as follows;

Table 3 (Results of Durbin-Watson statistics)

Period	d-statistic
9/4/92-24/9/92	0.133828*
25/9/92-23/2/93	0.203874*
24/2/93-6/8/93	0.197447*
9/8/93-8/12/93	0.061722*

* Significant at 1 percent level

The calculated DW statistic values were compared with tabulated values of d-statistics (see Appendix 5). All calculated d's were smaller than lower (d_L) bounds so it was concluded that there was a high positive autocorrelation between NYSE and ISE

5. CONCLUSION

Globalization of world stock markets and interdependencies between several markets have been widely discussed in recent literature. A number of macroeconomic and technical factors were discussed to have contributions to the increased interdependencies among national stock exchanges. These factors included growing international cooperation in macroeconomic policy making and a number of technological advances in communications and trading operations.

Parallel to his leading role in the world economy, US. have been the major stock market whose influence on other markets is analyzed. The influence of NYSE on many markets including Tokyo, Many European markets and some Asian markets was studied and the results supported the hypothesis that most markets were co-integrated with NYSE.

ISE, after its rapid development in 1980's, was in its way of becoming an international market in 1990's. In November 1993, it was awarded as an "accepted foreign investment market" by the Securities Exchanges Commission (SEC) in US.. The purpose of this thesis is to study the interdependence between NYSE and ISE, which could be a useful tool for both domestic and international investors.

Daily stock price indexes of NYSE and ISE were analyzed for the period between April 1992 and December 1993. Regression results showed that movements of the two stock indexes were at least linearly related. As a second step, Dickey-Fuller unit root tests were performed for both markets. Results of these tests revealed that market indexes for both markets were nonstationary series. In the final step, interdependence was analyzed using Durbin-Watson test in 100 day periods. The results of this test also supported the hypothesis that the two markets were strongly positively autocorrelated.

The findings of this study, that ISE is interdependent with NYSE , indicate the possibility to estimate the movements in ISE by examining the movements in NYSE. When price movements are small, the costs of buying and selling shares may exceed the potential gains from international arbitrage, however, in times of big price movements, arbitrage could be more profitable between the two stock exchanges.

The results are also consistent with findings of most authors since NYSE was proved to influence many stock markets and globalization of world stock exchanges was spelled to be an ongoing process.

Additional research should be done in two points, first by investigating the possibility of interdependence of ISE with other international stock markets like London, Tokyo or Frankfurt where mutual trade relationships with Turkey are present , by integrating more than two stock price indexes into analysis and testing for interdependence in a multivariate framework. Secondly, the power of Dickey-Fuller test is discussed to be limited as it only allows us to reject (or fail to reject) the hypothesis that a variable is not a nonstationary series although this test is widely used in the literature. Several alternative tests and variations of Dickey-Fuller test are proposed by many authors. Accuracy of some proposed tests could be compared for a similar study. The weakness of Dickey Fuller tests might also have affected the accuracy of the results in this study. Thirdly, the possibility of a profitable arbitrage between two markets should be investigated by taking several costs like investing in ISE from abroad and getting information about NYSE into consideration. Investing in foreign markets is a totally new concept in Turkey however some broker firms like ATA menkul kiymetler has begun acting in some international markets by opening liason offices in the U.S.. Finally, 382 days is a rather short period when compared with the length of the time series used in the

literature for interdependence analysis. The relationship between the two markets should be analysed for a longer time period for accuracy (at least for 5 years).

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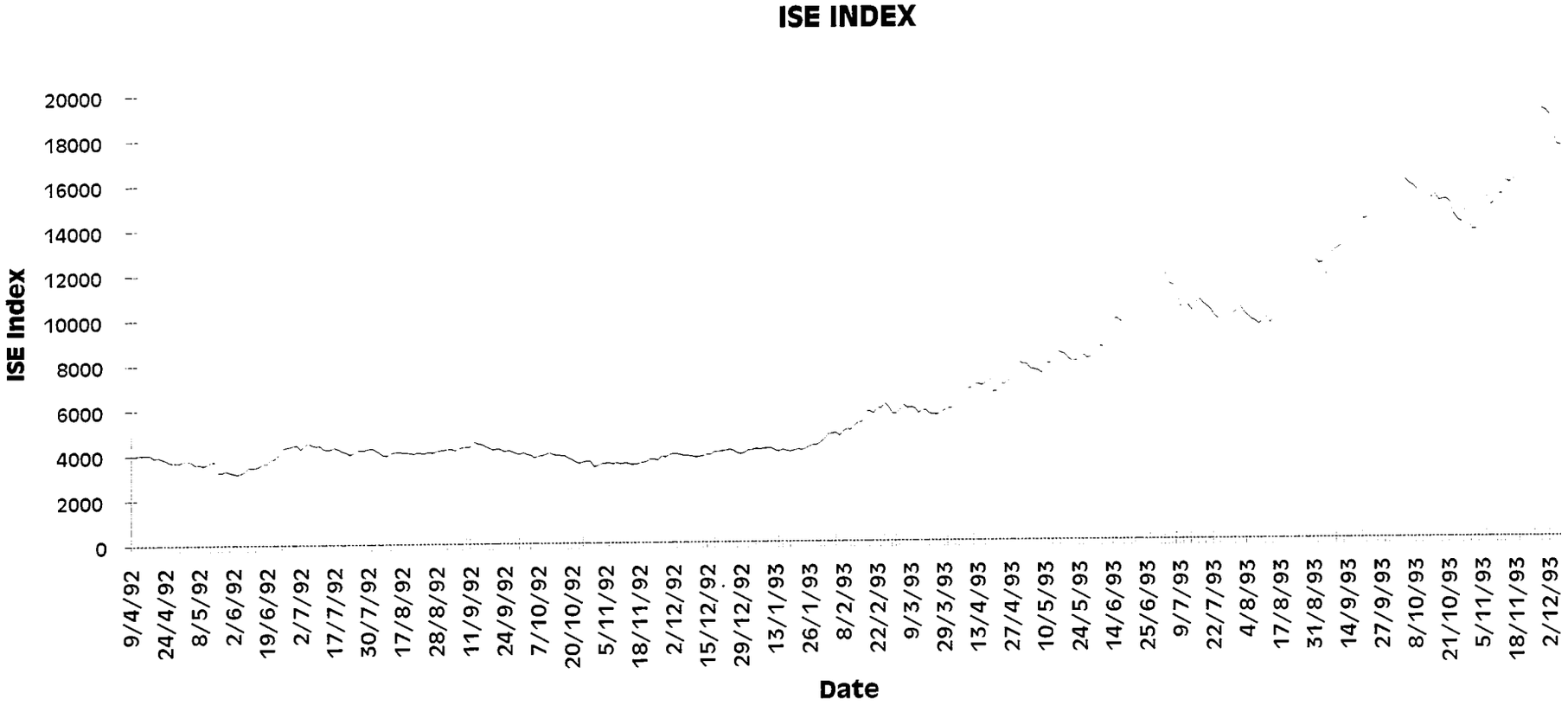
APPENDIX 1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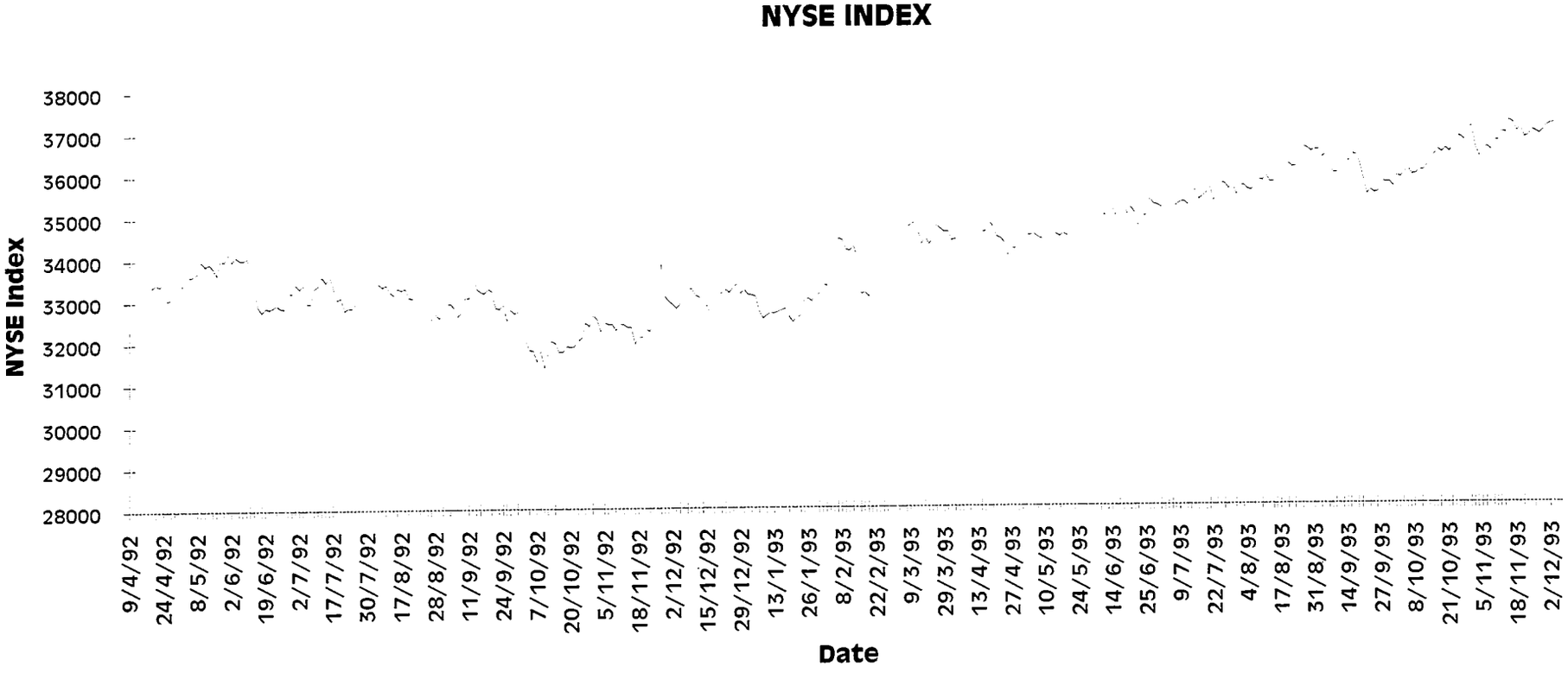
APPENDIX 1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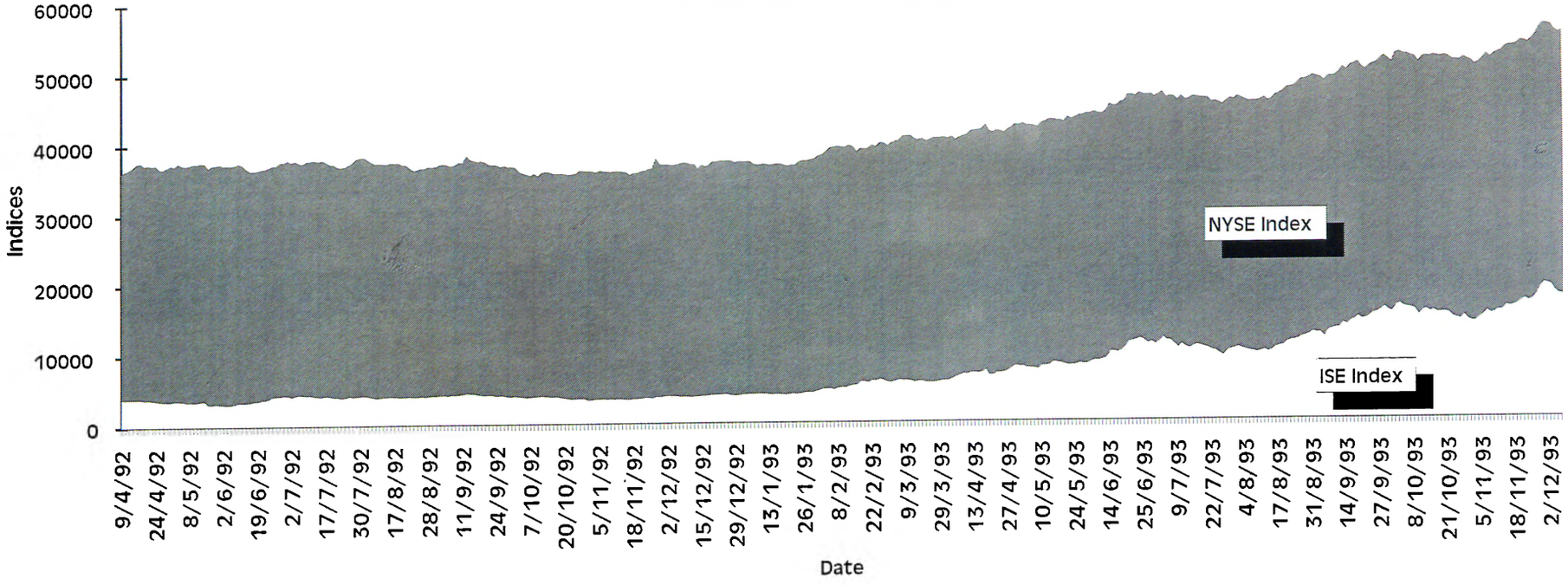
31/8/93
14/9/93
27/9/93
8/10/93
21/10/93
5/11/93
18/11/93
2/12/93
Date

APPENDIX 1

ISE AND NYSE INDICES



APPENDIX 2			
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3717	9	-96	-45
3679	10	-38	-96
3691	11	12	-38
3686	12	-5	12
3756	13	70	-5
3760	14	4	70
3704	15	-56	4
3576	16	-128	-56
3596	17	20	-128
3531	18	-65	20
3601	19	70	-65
3701	20	100	70
3714	21	13	100
3219	22	-495	13
3233	23	14	-495
3297	24	64	14
3234	25	-63	64
3198	26	-36	-63
3141	27	-57	-36
3191	28	50	-57
3263	29	72	50
3462	30	199	72
3433	31	-29	199
3453	32	20	-29
3519	33	66	20
3614	34	95	66
3613	35	-1	95
3804	36	191	-1
3840	37	36	191
3942	38	142	36
4291	39	309	142
4313	40	22	309
4365	41	52	22
4407	42	42	52
4442	43	35	42
4244	44	-198	35
4387	45	143	-198
4512	46	125	143
4426	47	-86	125
4384	48	-42	-86
4408	49	24	-42
4254	50	-154	24
4222	51	-32	-154
4237	52	15	-32
4304	53	67	15
4240	54	-64	67
4143	55	-97	-64
4091	56	-52	-97
4001	57	-90	-52
4059	58	58	-90

4210	59	151	58
4166	60	-44	151
4200	61	34	-44
4245	62	45	34
4264	63	19	45
4174	64	-90	19
4069	65	-105	-90
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4077	75	64	-22
4031	76	-46	64
4035	77	4	-46
4091	78	56	4
4048	79	-43	56
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4168	82	11	40
4204	83	36	11
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4142	85	-65	3
4254	86	112	-65
4283	87	29	112
4297	88	14	29
4322	89	25	14
4513	90	191	25
4446	91	-67	191
4416	92	-30	-67
4312	93	-104	-30
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3919	107	-36	-78
3814	108	-105	-36
3870	109	56	-105
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3940	109	37	33
4021	110	81	37
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3916	112	-18	-87
3901	113	-15	-18
3894	114	-7	-15
3790	115	-104	-7
3712	116	-78	-104
3621	117	-91	-78
3537	118	-84	-91

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3642	121	9	31
3380	122	-262	9
3442	123	62	-262
3525	124	83	62
3548	125	23	83
3552	126	4	23
3502	127	-50	4
3565	128	63	-50
3508	129	-57	63
3535	130	27	-57
3534	131	-1	27
3471	132	-63	-1
3479	133	8	-63
3529	134	50	8
3560	135	31	50
3598	136	38	31
3709	137	111	38
3708	138	-1	111
3651	139	-57	-1
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3921	144	-22	60
3891	145	-30	-22
3833	146	-58	-30
3856	147	23	-58
3816	148	-40	23
3775	149	-41	-40
3801	150	26	-41
3823	151	22	26
3901	152	78	22
3890	153	-11	78
4004	154	114	-11
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4030	156	8	18
4075	157	45	8
4094	158	19	45
4058	159	-36	19
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3955	162	39	-22
4072	163	117	39
4078	164	6	117
4125	165	47	6
4106	166	-19	47
4138	167	32	-19
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4145	169	-18	25
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3996	174	-21	-68
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4094	176	47	51
4062	177	-32	47
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4383	182	104	-8
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4748	184	197	168
4787	185	39	197
4816	186	29	39
4671	187	-145	29
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4943	190	-29	109
5128	191	185	-29
5244	192	116	185
5302	193	58	116
5756	194	454	58
5760	195	4	454
5655	196	-105	4
5922	197	267	-105
5876	198	-46	267
6091	199	215	-46
5923	200	-168	215
5650	201	-273	-168
5637	202	-13	-273
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6027	204	214	176
5883	205	-144	214
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5864	207	-68	49
5654	208	-210	-68
5757	209	103	-210
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5620	211	-172	35
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5588	213	-23	-9
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5861	216	97	108
5864	217	3	97
6070	218	206	3
6307	219	237	206
6544	220	237	237
6740	221	196	237
6733	222	-7	196
6925	223	192	-7
6933	224	8	192
6860	225	-73	8
6967	226	107	-73
7341	227	374	107
6574	228	-767	374
6609	229	35	-767
6921	230	312	35
6914	231	-7	312
7013	232	99	-7
7229	233	216	99
7570	234	341	216
7896	235	326	341
7807	236	-89	326
7805	237	-2	-89
7480	238	-225	-2

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7383	241	-122	-51
7864	242	481	-122
7812	243	-52	481
7952	244	140	-52
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8276	246	-73	397
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7926	250	7	-105
8008	251	82	7
8201	252	193	82
8045	253	-156	193
8096	254	51	-156
8375	255	279	51
8583	256	208	279
8537	257	-46	208
8687	258	150	-46
8835	259	148	150
9760	260	925	148
9804	261	44	925
9660	262	-144	44
9921	263	261	-144
10460	264	539	261
11140	265	680	539
11276	266	136	680
11412	267	136	136
11607	268	195	136
11338	269	-269	195
10967	270	-371	-269
11109	271	142	-371
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11145	273	367	-331
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11328	275	-466	649
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10365	280	-380	463
10144	281	-221	-380
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9897	287	-269	-137
9759	288	-138	-269
9370	289	-389	-138
9071	290	-299	-389
9714	291	643	-299
9956	292	242	643
10077	293	121	242
10295	294	218	121
10032	295	-263	218
9868	296	-164	-263
9715	297	-153	-164
9629	298	-86	-153

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9548	302	-273	178
9741	303	193	-273
10199	304	458	193
10354	305	155	458
10448	306	94	155
10915	307	467	94
11149	308	234	467
11189	309	40	234
11370	310	181	40
11671	311	301	181
11776	312	105	301
12020	313	244	105
12357	314	337	244
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12948	321	110	113
13555	322	607	110
13362	323	-193	607
13826	324	464	-193
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14459	326	433	200
14126	327	-333	433
14188	328	62	-333
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14886	330	384	314
15046	331	160	384
15386	332	340	160
15777	333	391	340
15328	334	-449	391
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15952	336	873	-249
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15862	338	-381	291
15698	339	-164	-381
15596	340	-102	-164
15439	341	-157	-102
14617	342	-822	-157
15241	343	624	-822
15361	344	120	624
15054	345	-307	120
15194	346	140	-307
14928	347	-266	140
14958	348	30	-266
14981	349	23	30
14826	350	-155	23
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13954	353	-115	-251
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13935	355	-565	546
13638	356	-297	-565
13633	357	-5	-297
14136	358	503	-5

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15085	360	599	350
14711	361	-374	599
14871	362	160	-374
15197	363	326	160
15177	364	-20	326
15787	365	610	-20
15702	366	-85	610
15789	367	87	-85
16091	368	302	87
16526	369	435	302
16727	370	201	435
16443	371	-284	201
16721	372	278	-284
17426	373	705	278
18426	374	1000	705
18977	375	551	1000
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APPENDIX 2			
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33591	13	-208	260
33383	14	398	-208
33781	15	-188	398
33593	16	40	-188
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33694	18	281	61
33975	19	-124	281
33851	20	68	-124
33919	21	-114	68
33805	22	-163	-114
33642	23	342	-163
33984	24	-16	342
33968	25	164	-16
34132	26	-171	164
33961	27	108	-171
34069	28	-72	108
33997	29	-11	-72
33986	30	55	-11
34041	31	-205	55
33836	32	-542	-205
33294	33	-417	-542
32877	34	-136	-417
32741	35	112	-136
32853	36	-45	112
32808	37	48	-45
32856	38	51	48
32907	39	-67	51
32840	40	-16	-67
32824	41	374	-16
33198	42	-13	374
33185	43	219	-13
33404	44	-102	219
33302	45	90	-102
33392	46	-441	90
32951	47	-19	-441
32932	48	373	-19
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33373	50	210	68
33583	51	-129	210
33454	52	162	-129
33616	53	-300	162
33316	54	-286	-300
33030	55	54	-286
33084	56	-308	54
32776	57	51	-308
32827	58	-3	51

32824	59	111	-3
32935	60	386	111
33321	61	470	386
33791	62	127	470
33918	63	19	127
33937	64	-286	19
33651	65	-246	-286
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33375	68	-167	54
33208	69	-76	-167
33132	70	157	-76
33289	71	-41	157
33248	72	46	-41
33294	73	-224	46
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33048	75	-507	-22
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32468	79	78	145
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32903	84	19	241
32922	85	-103	19
32819	86	-214	-103
32605	87	108	-214
32713	88	338	108
33051	89	6	338
33057	90	705	6
33762	91	-487	705
33275	92	-83	-487
33192	93	-35	-83
33157	94	113	-35
33270	95	-62	113
33208	96	-400	-62
32808	97	-22	-400
32786	98	92	-22
32878	99	-375	92
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32762	101	-94	259
32668	102	48	-94
32716	103	-173	48
32543	104	-537	-173
32006	105	-216	-537
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31781	107	-259	-9
31522	108	238	-259
31760	109	-395	238
31365	110	379	-395
31744	111	270	379
32014	112	-60	270
31954	113	-208	-60
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31884	116	-24	140
31860	117	11	-24
31871	118	135	11

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32076	120	365	70
32441	121	-84	365
32357	122	266	-84
32623	123	-99	266
32524	124	-294	-99
32230	125	208	-294
32438	126	-38	208
32400	127	8	-38
32408	128	-154	8
32254	129	149	-154
32408	130	-6	149
32397	131	-67	-6
32330	132	0	-67
32330	133	-397	0
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32095	136	173	22
32273	137	-43	178
32230	138	257	-43
32487	139	175	257
32662	140	1160	175
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33238	149	-165	17
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33040	151	-717	-33
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32551	154	141	-292
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33132	156	-8	440
33124	157	87	-8
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33333	161	-225	71
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32646	170	-11	65
32635	171	43	-11
32678	172	33	43
32711	173	38	33
32749	173	-190	38
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32530	177	38	111
32568	178	355	38

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33062	182	38	149
33100	183	221	38
33321	184	-35	221
33286	185	451	-35
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34167	187	257	430
34424	188	-49	257
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34145	190	-21	-230
34124	191	102	-21
34226	192	-302	102
33924	193	-830	-302
33094	194	27	-830
33121	195	-100	27
33021	196	200	-100
33221	197	208	200
33429	198	-197	208
33232	199	333	-197
33565	200	145	333
33710	201	-156	145
33554	202	451	-156
34005	203	35	451
34040	204	-51	35
33989	205	705	-51
34694	206	27	705
34721	207	62	27
34783	208	-213	62
34570	209	-292	-213
34278	210	146	-292
34424	211	-157	146
34267	212	94	-157
34361	213	354	94
34715	214	-81	354
34634	215	-83	-81
34551	216	21	-83
34572	217	-221	21
34351	218	43	-221
34394	219	-686	43
33708	220	83	-686
33791	221	-16	83
33775	222	195	-16
33970	223	310	195
34280	224	160	310
34440	225	113	160
34553	226	6	113
34559	227	227	6
34786	228	-117	227
34669	229	-235	-117
34434	230	-40	-235
34394	231	-103	-40
34291	232	-308	-103
33983	233	176	-308
34159	234	-24	176
34135	235	116	-24
34251	236	24	116
34275	237	189	24
34464	238	-3	189

34461	239	30	-3
34491	240	-72	30
34419	241	-48	-72
34371	242	61	-48
34432	243	255	61
34687	244	136	255
34823	245	-344	136
34479	246	-49	-344
34430	247	66	-49
34496	248	-53	66
34443	249	789	-53
35232	250	-304	789
34928	251	149	-304
35077	252	89	149
35166	253	235	89
35401	254	147	235
35548	255	-274	147
35274	256	47	-274
35321	257	-202	47
35119	258	-202	-202
34917	259	133	-202
35050	260	96	133
35146	261	-226	96
34920	262	196	-226
35116	263	102	196
35218	264	-271	102
34947	265	161	-271
35108	266	-133	161
34975	267	-307	-133
34668	268	238	-307
34906	269	2	238
34908	270	394	2
35302	271	-114	394
35188	272	-28	-114
35160	273	-55	-28
35105	274	-266	-55
34839	275	-340	-266
34499	276	257	-340
34756	277	388	257
35144	278	66	388
35210	279	33	66
35243	280	-89	33
35154	281	271	-89
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35509	283	-224	84
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35447	286	107	95
36554	287	-302	107
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35520	297	-31	-92
35489	298	115	-31

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35760	300	-33	156
35727	301	106	-33
35833	302	-143	106
35690	303	6	-143
35696	304	95	6
35791	305	78	95
35869	306	179	78
36048	307	73	179
36121	308	-78	73
36043	309	19	-78
36062	310	327	19
36389	311	131	327
36520	312	-39	131
36481	313	-75	-39
36406	314	45	-75
36451	315	0	45
36451	316	-190	0
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36339	318	-268	78
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35894	321	322	5
36216	322	126	322
36342	323	-185	126
36157	324	179	-185
36336	325	-28	179
36308	326	-176	-28
36132	327	-374	-176
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35397	331	34	-73
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35677	333	-17	246
35660	334	3	-17
35663	335	-112	3
35551	336	260	-112
35811	337	-34	260
35777	338	95	-34
35872	339	117	95
35989	340	-153	117
35836	341	11	-153
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35934	343	-3	87
35931	344	100	-3
36031	345	185	100
36216	346	81	185
36297	347	126	81
36423	348	-70	126
36353	349	98	-70
36451	350	-90	98
36361	351	132	-90
36493	352	243	132
36736	353	-12	243
36724	354	-78	-12
36646	355	280	-78
36926	356	50	280
36976	357	-503	50
36473	358	-224	-503

36249	359	185	-224
36434	360	45	185
36479	361	-79	45
36400	362	235	-79
36635	363	-11	235
36624	364	221	-11
36845	365	-42	221
36803	366	304	-42
37107	367	-64	304
37043	368	-190	-64
36853	369	87	-190
36940	370	-238	87
36702	371	39	-238
36741	372	134	39
36875	373	-36	134
36839	374	-61	-36
36778	375	92	-61
36870	376	100	92
36970	377	51	100
37021	378	19	51
37040	379	148	19
37188	380	157	148
N=NYSE index			
N1=N(t)-N(t-1)			
N2=N(t-1)-N(t-2)			

APPENDIX 2 CONT.
ISE Restricted Regression Results

The regression equation is
I1 = 30.4 + 0.129 I2

Predictor	Coef	Stdev	t-ratio	p
Constant	30.41	12.03	2.53	0.012
I2	0.12881	0.05097	2.53	0.012

s = 231.9 R-sq = 1.7% R-sq(adj) = 1.4%

Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	1	343499	343499	6.39	0.012
Error	378	20330316	53784		
Total	379	20673814			

Unusual Observations

Obs.	I2	I1	Fit	Stdev.Fit	Residual	St.Resid
22	13	-495.0	32.1	12.0	-527.1	-2.28R
23	-495	14.0	-33.3	29.5	47.3	0.21 X
228	374	-767.0	78.6	21.0	-845.6	-3.66R
229	-767	35.0	-68.4	42.6	103.4	0.45 X
242	-122	481.0	14.7	14.3	466.3	2.01R
260	148	925.0	49.5	13.2	875.5	3.78R
261	925	44.0	149.6	46.9	-105.6	-0.46 X
264	261	539.0	64.0	16.6	475.0	2.05R
265	539	680.0	99.8	28.3	580.2	2.52R
266	680	136.0	118.0	35.0	18.0	0.08 X
274	367	649.0	77.7	20.7	571.3	2.47R
275	649	-466.0	114.0	33.5	-580.0	-2.53RX
277	-65	-474.0	22.0	12.9	-496.0	-2.14R
278	-474	-507.0	-30.6	28.6	-476.4	-2.07R
279	-507	463.0	-34.9	30.1	497.9	2.17RX
280	463	-380.0	90.1	24.8	-470.1	-2.04R
291	-299	643.0	-8.1	20.8	651.1	2.82R
292	643	242.0	113.2	33.2	128.8	0.56 X
317	52	-568.0	37.1	11.9	-605.1	-2.61R
318	-568	871.0	-42.7	33.0	913.7	3.98RX
319	871	199.0	142.6	44.2	56.4	0.25 X
322	110	607.0	44.6	12.5	562.4	2.43R

323	607	-193.0	108.6	31.5	-301.6	-1.31 X
334	391	-449.0	80.8	21.7	-529.8	-2.29R
336	-249	873.0	-1.7	18.7	874.7	3.78R
337	873	291.0	142.9	44.3	148.1	0.65 X
342	-157	-822.0	10.2	15.4	-832.2	-3.60R
343	-822	624.0	-75.5	45.3	699.5	3.08RX
344	624	120.0	110.8	32.3	9.2	0.04 X
351	-155	-506.0	10.4	15.3	-516.4	-2.23R
352	-506	-251.0	-34.8	30.0	-216.2	-0.94 X
354	-115	546.0	15.6	14.1	530.4	2.29R
355	546	-565.0	100.7	28.6	-665.7	-2.89R
356	-565	-297.0	-42.4	32.8	-254.6	-1.11 X
358	-5	503.0	29.8	12.1	473.2	2.04R
360	350	599.0	75.5	20.0	523.5	2.27R
361	599	-374.0	107.6	31.1	-481.6	-2.10RX
365	-20	610.0	27.8	12.2	582.2	2.51R
366	610	-85.0	109.0	31.6	-194.0	-0.84 X
373	278	705.0	66.2	17.2	638.8	2.76R
374	705	1000.0	121.2	36.2	878.8	3.84RX
375	1000	551.0	159.2	50.6	391.8	1.73 X
378	-208	-782.0	3.6	17.2	-785.6	-3.40R
379	-782	-511.0	-70.3	43.3	-440.7	-1.93 X
380	-511	-47.0	-35.4	30.3	-11.6	-0.05 X

R denotes an obs. with a large st. resid.
X denotes an obs. whose X value gives it large influence.

APPENDIX 2 CONT.
NYSE Restricted Regression Results

The regression equation is
I1 = 13.2 - 0.0463 I2

Predictor	Coef	Stdev	t-ratio	p
Constant	13.21	11.55	1.14	0.253
I2	-0.04632	0.05129	-0.90	0.367

s = 224.7 R-sq = 0.2% R-sq(adj) = 0.0%

Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	1	41200	41200	0.82	0.367
Error	378	19093630	50512		
Total	379	19134830			

Unusual Observations

Obs.	I2	I1	Fit	Stdev.Fit	Residual	St.Resid
3	362	476.0	-3.6	21.3	479.6	2.14R
9	132	-474.0	7.1	13.0	-481.1	-2.14R
32	-205	-542.0	22.7	16.1	-564.7	-2.52R
33	-542	-417.0	38.3	30.7	-455.3	-2.05RX
46	90	-441.0	9.0	12.2	-450.0	-2.01R
61	386	470.0	-4.7	22.3	474.7	2.12R
75	-22	-507.0	14.2	11.7	-521.2	-2.32R
76	-507	-305.0	36.7	29.1	-341.7	-1.53 X
90	6	705.0	12.9	11.5	692.1	3.08R
91	705	-487.0	-19.4	37.3	-467.6	-2.11RX
104	-173	-537.0	21.2	15.0	-558.2	-2.49R
105	-537	-216.0	38.1	30.5	-254.1	-1.14 X
140	175	1160.0	5.1	14.2	1154.9	5.15R
141	1160	-771.0	-40.5	60.0	-730.5	-3.37RX
142	-771	-108.0	48.9	41.8	-156.9	-0.71 X
151	-33	-717.0	14.7	11.8	-731.7	-3.26R
152	-717	520.0	46.4	39.2	473.6	2.14RX
153	520	-292.0	-10.9	28.4	-281.1	-1.26 X
193	-302	-830.0	27.2	19.8	-857.2	-3.83R
194	-830	27.0	51.7	44.8	-24.7	-0.11 X
205	-51	705.0	15.6	12.0	689.4	3.07R
206	705	27.0	-19.4	37.3	46.4	0.21 X

219	43	-686.0	11.2	11.6	-697.2	-3.11R
220	-686	83.0	45.0	37.7	38.0	0.17 X
249	-53	789.0	15.7	12.0	773.3	3.45R
250	789	-304.0	-23.3	41.4	-280.7	-1.27 X
357	50	-503.0	10.9	11.7	-513.9	-2.29R
358	-503	-224.0	36.5	28.9	-260.5	-1.17 X

R denotes an obs. with a large st. resid.
X denotes an obs. whose X value gives it large influence.

APPENDIX 2 CONT.
ISE Unrestricted Regression Results

The regression equation is
I1 = - 9.2 + 0.534 Time - 0.00841 I + 0.118 I2

Predictor	Coef	Stdev	t-ratio	p
Constant	-9.23	24.11	-0.38	0.702
Time	0.5338	0.2444	2.18	0.030
I	-0.008409	0.0062	-1.34	0.182
I2	0.11829	0.05121	2.31	0.021

s = 230.5 R-sq = 3.4% R-sq(adj) = 2.6%

Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	3	700080	233360	4.39	0.005
Error	376	19973734	53122		
Total	379	20673814			

SOURCE	DF	SEQ SS
Time	1	341583
I	1	75040
I2	1	283457

Unusual Observations

Obs.	Time	I1	Fit	Stdev.Fit	Residual	St.Resid
22	22	-495.0	-27.2	25.9	-467.8	-2.04R
228	228	-767.0	95.0	22.9	-862.0	-3.76R
229	229	35.0	-33.0	44.7	68.0	0.30 X
260	260	925.0	72.8	16.0	852.2	3.71R
261	261	44.0	157.4	46.7	-113.4	-0.50 X
264	264	539.0	79.1	17.7	459.9	2.00R
265	265	680.0	108.0	28.6	572.0	2.50R
274	274	649.0	86.7	22.1	562.3	2.45R
275	275	-466.0	115.2	34.5	-581.2	-2.55R
277	277	-474.0	36.2	17.5	-510.2	-2.22R
278	278	-507.0	-7.6	31.5	-499.4	-2.19R

279	279	463.0	-6.7	32.7	469.7	2.06R
280	280	-380.0	104.7	25.6	-484.7	-2.12R
291	291	643.0	34.5	26.4	608.5	2.66R
317	317	-568.0	63.4	18.3	-631.4	-2.75R
318	318	871.0	-4.7	37.4	875.7	3.85R
319	319	199.0	158.8	44.8	40.2	0.18 X
322	322	607.0	66.8	19.6	540.2	2.35R
334	334	-449.0	82.6	32.6	-531.6	-2.33R
336	336	873.0	13.9	31.3	859.1	3.76R
337	337	291.0	139.8	49.2	151.2	0.67 X
342	342	-822.0	24.9	29.9	-846.9	-3.71R
343	343	624.0	-46.3	52.5	670.3	2.99RX
351	351	-506.0	35.1	27.3	-541.1	-2.36R
354	354	546.0	48.8	24.3	497.2	2.17R
355	355	-565.0	122.9	32.8	-687.9	-3.02R
360	360	599.0	102.5	26.6	496.5	2.17R
361	361	-374.0	127.5	35.6	-501.5	-2.20R
365	365	610.0	55.6	25.5	554.4	2.42R
373	373	705.0	82.2	31.0	622.8	2.73R
374	374	1000.0	127.3	44.4	872.7	3.86RX
375	375	551.0	154.3	58.3	396.7	1.78 X
376	376	-94.0	97.1	45.4	-191.1	-0.85 X
378	378	-782.0	10.9	41.8	-792.9	-3.50RX
379	379	-511.0	-49.9	57.5	-461.1	-2.07RX
380	380	-47.0	-13.0	45.3	-34.0	-0.15 X

R denotes an obs. with a large st. resid.
X denotes an obs. whose X value gives it large influence.

APPENDIX 2 CONT.
NYSE Unrestricted Regression Results

The regression equation is
I1 = 1240 + 0.495 Time - 0.0387 I - 0.0267 I2

Predictor	Coef	Stdev	t-ratio	p
Constant	1239.8	470.4	2.64	0.009
Time	0.4953	0.1930	2.57	0.011
I	-0.03867	0.01466	-2.64	0.009
I2	-0.02672	0.05153	-0.52	0.604

s = 223.2 R-sq = 2.1% R-sq(adj) = 1.4%

Analysis of Variance

SOURCE	DF	SS	MS	F	p
Regression	3	408343	136114	2.73	0.044
Error	376	18726486	49804		
Total	379	19134830			

SOURCE	DF	SEQ SS
Time	1	19248
I	1	375700
I2	1	13395

Unusual Observations

Obs.	Time	I1	Fit	Stdev. Fit	Residual	St.Resid
3	3	476.0	-46.9	31.3	522.9	2.37R
32	32	-542.0	-47.3	32.1	-494.7	-2.24R
61	61	470.0	-28.8	26.8	498.8	2.25R
75	75	-507.0	-0.4	16.9	-506.6	-2.28R
90	90	705.0	5.9	15.5	699.1	3.14R
91	91	-487.0	-39.6	39.0	-447.4	-2.04R
104	104	-537.0	37.5	19.2	-574.5	-2.58R
109	109	-395.0	59.3	30.1	-454.3	-2.05R
133	133	-397.0	55.5	21.7	-452.5	-2.04R
140	14	1160.0	41.4	21.4	1118.6	5.04R
141	141	-771.0	-29.3	60.2	-741.7	-3.45RX
142	142	-108.0	52.6	41.8	-160.6	-0.73 X
151	151	-717.0	37.8	15.7	-754.8	-3.39R
152	152	520.0	84.3	41.9	435.7	1.99 X

193	193	-830.0	31.6	19.8	-861.6	-3.88R
194	194	27.0	78.3	45.5	-51.3	-0.23 X
205	205	705.0	28.3	12.8	676.7	3.04R
219	219	-686.0	17.1	12.0	-703.1	-3.16R
249	249	789.0	32.6	14.3	756.4	3.40R
250	250	-304.0	-19.9	41.5	-284.1	-1.30 X
357	357	-503.0	-14.6	25.1	-488.4	-2.20R

R denotes an obs. with a large st. resid.
X denotes an obs. whose X value gives it large influence.

APPENDIX 3

Values of Dickey-Fuller F ratios

EMPRICAL DISTRIBUTION FOR (A, B, P)=(A,0,1)								
Sample								
size	Probability of a smaller value							
n	0.01	0.025	0.05	0.1	0.9	0.95	0.975	0.99
25	0.74	0.9	1.08	1.33	5.91	7.24	8.65	10.61
50	0.76	0.93	1.11	1.37	5.61	6.73	7.81	9.31
100	0.76	0.94	1.12	1.38	5.47	6.49	7.44	8.73
250	0.76	0.94	1.13	1.39	5.39	6.34	7.25	8.43
500	0.76	0.94	1.13	1.39	5.36	6.3	7.2	8.34
n>500	0.77	0.94	1.13	1.39	5.34	6.25	7.16	8.27

Dickey and Fuller, 1981

APPENDIX 4

Data Used For D-Statistics

DATE	ISE	NYSE	Y	R_t	R_{t-1}	R_t square	R_t-R_{t-1} square
9/4/92	4010	32249	2214.699	1795.301		3223105.681	
10/4/92	3985	32553	3029.723	955.277	1795.301	912554.1467	705640.3
13/4/92	4027	32699	3421.149	605.851	955.277	367055.4342	122098.5
14/4/92	4026	33061	4391.671	-365.671	605.851	133715.2802	943855
15/4/92	4049	33537	5667.827	-1618.827	-365.671	2620600.856	1570400
16/4/92	4020	33665	6010.995	-1990.995	-1618.827	3964061.09	138509
20/4/92	3896	33363	5201.333	-1305.333	-1990.995	1703894.241	470132.4
21/4/92	3939	33432	5386.322	-1447.322	-1305.333	2094740.972	20160.88
22/4/92	3858	33387	5265.677	-1407.677	-1447.322	.1981554.536	1571.726
24/4/92	3813	33519	5619.569	-1806.569	-1407.677	3263691.552	159114.8
27/4/92	3717	33045	4348.775	-631.775	-1806.569	399139.6506	1380141
28/4/92	3679	33079	4439.929	-760.929	-631.775	579012.943	16680.76
29/4/92	3691	33331	5115.541	-1424.541	-760.929	2029317.061	440380.9
30/4/92	3686	33591	5812.601	-2126.601	-1424.541	4522431.813	492888.2
1/5/92	3756	33383	5254.953	-1498.953	-2126.601	2246860.096	393942
4/5/92	3760	33781	6321.991	-2561.991	-1498.953	6563797.884	1130050
5/5/92	3704	33593	5817.963	-2113.963	-2561.991	4468839.565	200729.1
7/5/92	3576	33633	5925.203	-2349.203	-2113.963	5518754.735	55337.86
8/5/92	3596	33694	6088.744	-2492.744	-2349.203	6213772.65	20604.02
11/5/92	3531	33975	6842.105	-3311.105	-2492.744	10963416.32	669714.7
12/5/92	3601	33851	6509.661	-2908.661	-3311.105	8460308.813	161961.2
13/5/92	3701	33919	6691.969	-2990.969	-2908.661	8945895.559	6774.607
14/5/92	3714	33805	6386.335	-2672.335	-2990.969	7141374.352	101527.6
26/5/92	3219	33642	5949.332	-2730.332	-2672.335	7454712.83	3363.652
28/5/92	3233	33984	6866.234	-3633.234	-2730.332	13200389.3	815232
29/5/92	3297	33968	6823.338	-3526.338	-3633.234	12435059.69	11426.75
1/6/92	3234	34132	7263.022	-4029.022	-3526.338	16233018.28	252691.2
2/6/92	3198	33961	6804.571	-3606.571	-4029.022	13007354.38	178464.8
3/6/92	3141	34069	7094.119	-3953.119	-3606.571	15627149.83	120095.5
4/6/92	3191	33997	6901.087	-3710.087	-3953.119	13764745.55	59064.55
5/6/92	3263	33986	6871.596	-3608.596	-3710.087	13021965.09	10300.42
8/6/92	3462	34041	7019.051	-3557.051	-3608.596	12652611.82	2656.887
9/6/92	3433	33836	6469.446	-3036.446	-3557.051	9220004.311	271029.6
16/6/92	3453	33294	5016.344	-1563.344	-3036.446	2444044.462	2170030
17/6/92	3519	32877	3898.367	-379.367	-1563.344	143919.3207	1401802
18/6/92	3614	32741	3533.751	80.249	-379.367	6439.902001	211246.9
19/6/92	3613	32853	3834.023	-221.023	80.249	48851.16653	90764.82
22/6/92	3804	32808	3713.378	90.622	-221.023	8212.346884	97122.61
23/6/92	3840	32856	3842.066	-2.066	90.622	4.268356	8591.065
24/6/92	3982	32907	3978.797	3.203	-2.066	10.259209	27.76236
25/6/92	4291	32840	3799.17	491.83	3.203	241896.7489	238756.3
26/6/92	4313	32824	3756.274	556.726	491.83	309943.8391	4211.491
29/6/92	4365	33198	4758.968	-393.968	556.726	155210.785	903819.1

30/6/92	4407	33185	4724.115	-317.115	-393.968	100561.9232	5906.384
1/7/92	4442	33404	5311.254	-869.254	-317.115	755602.5165	304857.5
2/7/92	4244	33302	5037.792	-793.792	-869.254	630105.7393	5694.513
6/7/92	4387	33392	5279.082	-892.082	-793.792	795810.2947	9660.924
7/7/92	4512	32951	4096.761	415.239	-892.082	172423.4271	1709088
8/7/92	4426	32932	4045.822	380.178	415.239	144535.3117	1229.274
10/7/92	4384	33305	5045.835	-661.835	380.178	438025.5672	1085791
13/7/92	4408	33373	5228.143	-820.143	-661.835	672634.5404	25061.42
14/6/92	4254	33583	5791.153	-1537.153	-820.143	2362839.345	514103.3
15/7/92	4222	33454	5445.304	-1223.304	-1537.153	1496472.676	98501.19
16/7/92	4237	33616	5879.626	-1642.626	-1223.304	2698220.176	175830.9
17/7/92	4304	33316	5075.326	-771.326	-1642.626	594943.7983	759163.7
20/7/92	4240	33030	4308.56	-68.56	-771.326	4700.4736	493880.1
21/7/92	4143	33084	4453.334	-310.334	-68.56	96307.19156	58454.67
22/7/92	4091	32776	3627.586	463.414	-310.334	214752.5354	598686
23/7/92	4001	32827	3764.317	236.683	463.414	56018.84249	51406.95
24/7/92	4059	32824	3756.274	302.726	236.683	91643.03108	4361.678
27/7/92	4210	32935	4053.865	156.135	302.726	24378.13822	21488.92
28/7/92	4166	33321	5088.731	-922.731	156.135	851432.4984	1163952
29/7/92	4200	33791	6348.801	-2148.801	-922.731	4617345.738	1503248
30/7/92	4245	33918	6689.288	-2444.288	-2148.801	5974543.827	87312.57
31/7/92	4264	33937	6740.227	-2476.227	-2444.288	6131700.156	1020.1
5/8/92	4174	33651	5973.461	-1799.461	-2476.227	3238059.891	458012.2
6/8/92	4069	33405	5313.935	-1244.935	-1799.461	1549863.154	307499.1
7/8/92	3943	33321	5088.731	-1145.731	-1244.935	1312699.524	9841.434
10/8/92	3939	33375	5233.505	-1294.505	-1145.731	1675743.195	22133.7
12/8/92	4062	33208	4785.778	-723.778	-1294.505	523854.5933	325729.3
13/8/92	4066	33132	4582.022	-516.022	-723.778	266278.7045	43162.56
14/8/92	4104	33289	5002.939	-898.939	-516.022	808091.3257	146625.4
17/8/92	4076	33248	4893.018	-817.018	-898.939	667518.4123	6711.05
18/8/92	4053	33294	5016.344	-963.344	-817.018	928031.6623	21411.3
19/8/92	4035	33070	4415.8	-380.8	-963.344	145008.64	339357.5
20/8/92	4013	33048	4356.818	-343.818	-380.8	118210.8171	1367.668
21/8/92	4077	32541	2997.551	1079.449	-343.818	1165210.144	2025689
24/8/92	4031	32236	2179.846	1851.154	1079.449	3426771.132	595528.6
25/8/92	4035	32323	2413.093	1621.907	1851.154	2630582.317	52554.19
26/8/92	4091	32468	2801.838	1289.162	1621.907	1661938.662	110719.2
27/8/92	4048	32546	3010.956	1037.044	1289.162	1075460.258	63563.49
28/8/92	4117	32676	3359.486	757.514	1037.044	573827.4602	78137.02
31/8/92	4157	32573	3083.343	1073.657	757.514	1152739.354	99946.4
1/9/92	4168	32662	3321.952	846.048	1073.657	715797.2183	51805.86
2/9/92	4204	32903	3968.073	235.927	846.048	55661.54933	372247.6
3/9/92	4207	32922	4019.012	187.988	235.927	35339.48814	2298.148
4/9/92	4142	32819	3742.869	399.131	187.988	159305.5552	44581.37
8/9/92	4254	32605	3169.135	1084.865	399.131	1176932.068	470231.1
9/9/92	4283	32713	3458.683	824.317	1084.865	679498.5165	67885.26

10/9/92	4297	33051	4364.861	-67.861	824.317	4605.115321	795981.6
11/9/92	4322	33057	4380.947	-58.947	-67.861	3474.748809	79.4594
14/9/92	4513	33762	6271.052	-1758.052	-58.947	3090746.835	2886958
15/9/92	4446	33275	4965.405	-519.405	-1758.052	269781.554	1534246
16/9/92	4416	33192	4742.882	-326.882	-519.405	106851.8419	37065.11
17/9/92	4312	33157	4649.047	-337.047	-326.882	113600.6802	103.3272
18/9/92	4246	33270	4952	-706	-337.047	498436	136126.3
21/9/92	4171	33208	4785.778	-614.778	-706	377951.9893	8321.453
22/9/92	4212	32808	3713.378	498.622	-614.778	248623.8989	1239660
23/9/92	4182	32786	3654.396	527.604	498.622	278365.9808	839.9563
24/9/92	4090	32878	3901.048	188.952	527.604	35702.8583	114685.2
						SUM OF $(R_t)^2$	SUM OF $(R_t-R_{t-1})^2$
						277989002.3	37202714
					DW Statistics	0.133828	

DATE	ISE	NYSE	Y	R_t	R_{t-1}	R_t square	R_t-R_{t-1} square
25/9/92	4144	32503	2895.673	1248.327		1558320.299	
28/9/92	4088	32762	3590.052	497.948	1248.327	247952.2107	563068.6
29/9/92	4004	32668	3338.038	665.962	497.948	443505.3854	28228.7
30/9/92	3976	32716	3466.726	509.274	665.962	259360.0071	24551.13
1/10/92	4033	32543	3002.913	1030.087	509.274	1061079.228	271246.2
2/10/92	3955	32006	1563.216	2391.784	1030.087	5720630.703	1854219
5/10/92	3919	31790	984.12	2934.88	2391.784	8613520.614	294953.3
6/10/92	3814	31781	959.991	2854.009	2934.88	8145367.372	6540.119
7/10/92	3870	31522	265.612	3604.388	2854.009	12991612.85	563068.6
8/10/92	3903	31760	903.69	2999.31	3604.388	8995860.476	366119.4
9/10/92	3940	31365	-155.305	4095.305	2999.31	16771523.04	1201205
12/10/92	4021	31744	860.794	3160.206	4095.305	9986901.962	874410.1
13/10/92	3934	32014	1584.664	2349.336	3160.206	5519379.641	657510.2
14/10/92	3916	31954	1423.804	2492.196	2349.336	6211040.902	20408.98
15/10/92	3901	31746	866.156	3034.844	2492.196	9210278.104	294466.9
16/10/92	3894	31744	860.794	3033.206	3034.844	9200338.638	2.683044
19/10/92	3790	31884	1236.134	2553.866	3033.206	6522231.546	229766.8
20/10/92	3712	31860	1171.79	2540.21	2553.866	6452666.844	186.4863
21/10/92	3621	31871	1201.281	2419.719	2540.21	5855040.039	14518.08
22/10/92	3537	32006	1563.216	1973.784	2419.719	3895823.279	198858
23/10/92	3602	32076	1750.886	1851.114	1973.784	3426623.041	15047.93
26/10/92	3633	32441	2729.451	903.549	1851.114	816400.7954	897879.4
27/10/92	3642	32357	2504.247	1137.753	903.549	1294481.889	54851.51
2/11/92	3380	32623	3217.393	162.607	1137.753	26441.03645	950909.7
3/11/92	3442	32524	2951.974	490.026	162.607	240125.4807	107203.2
4/11/92	3525	32230	2163.76	1361.24	490.026	1852974.338	759013.8
5/11/92	3548	32438	2721.408	826.592	1361.24	683254.3345	285848.5
6/11/92	3552	32400	2619.53	932.47	826.592	869500.3009	11210.15
9/11/92	3502	32408	2640.978	861.022	932.47	741358.8845	5104.817
10/11/92	3565	32254	2228.104	1336.896	861.022	1787290.915	226456.1
11/11/92	3508	32403	2627.573	880.427	1336.896	775151.7023	208363.9
12/11/92	3535	32397	2611.487	923.513	880.427	852876.2612	1856.403
13/11/92	3534	32330	2431.86	1102.14	923.513	1214712.58	31907.61
16/11/92	3471	32330	2431.86	1039.14	1102.14	1079811.94	3969
17/11/92	3479	31933	1367.503	2111.497	1039.14	4458419.581	1149950
18/11/92	3529	32073	1742.843	1786.157	2111.497	3190356.829	105846.1
19/11/92	3560	32095	1801.825	1758.175	1786.157	3091179.331	782.9923
20/11/92	3598	32273	2279.043	1318.957	1758.175	1739647.568	192912.5
23/11/92	3709	32230	2163.76	1545.24	1318.957	2387766.658	51204
24/11/92	3708	32487	2852.777	855.223	1545.24	731406.3797	476123.5
25/11/92	3651	32662	3321.952	329.048	855.223	108272.5863	276860.1
27/11/92	3841	33822	6431.912	-2590.912	329.048	6712824.992	8526166
30/11/92	3786	33051	4364.861	-578.861	-2590.912	335080.0573	4048349

1/12/92	3883	32943	4075.313	-192.313	-578.861	36984.28997	149419.4
2/12/92	3943	32862	3858.152	84.848	-192.313	7199.183104	76818.22
3/12/92	3921	32765	3598.095	322.905	84.848	104267.639	56671.14
4/12/92	3891	32886	3922.496	-31.496	322.905	991.998016	125600.1
7/12/92	3833	33073	4423.843	-590.843	-31.496	349095.4506	312869.1
8/12/92	3856	33221	4820.631	-964.631	-590.843	930512.9662	139717.5
9/12/92	3816	33238	4866.208	-1050.208	-964.631	1102936.843	7323.423
10/12/92	3775	33073	4423.843	-648.843	-1050.208	420997.2386	161093.9
11/12/92	3801	33040	4335.37	-534.37	-648.843	285551.2969	13104.07
14/12/92	3823	32323	2413.093	1409.907	-534.37	1987837.749	3780213
15/12/92	3901	32843	3807.213	93.787	1409.907	8796.001369	1732172
16/12/92	3890	32551	3024.361	865.639	93.787	749330.8783	595755.5
17/12/92	4004	32692	3402.382	601.618	865.639	361944.2179	69707.09
18/12/92	4022	33132	4582.022	-560.022	601.618	313624.6405	1349407
21/12/92	4030	33124	4560.574	-530.574	-560.022	281508.7695	867.1847
22/12/92	4075	33211	4793.821	-718.821	-530.574	516703.63	35436.93
23/12/92	4094	33135	4590.065	-496.065	-718.821	246080.4842	49620.24
24/12/92	4058	33262	4930.552	-872.552	-496.065	761346.9927	141742.5
28/12/92	3938	33333	5120.903	-1182.903	-872.552	1399259.507	96317.74
29/12/92	3916	33108	4517.678	-601.678	-1182.903	362016.4157	337822.5
30/12/92	3955	33211	4793.821	-838.821	-601.678	703620.67	56236.8
4/1/93	4072	33092	4474.782	-402.782	-838.821	162233.3395	190130
5/1/93	4078	33078	4437.248	-359.248	-402.782	129059.1255	1895.209
6/1/93	4125	33051	4364.861	-239.861	-359.248	57533.29932	14253.26
7/1/93	4106	32689	3394.339	711.661	-239.861	506461.3789	905394.1
8/1/93	4138	32516	2930.526	1207.474	711.661	1457993.461	245830.5
11/1/93	4163	32581	3104.791	1058.209	1207.474	1119806.288	22280.04
12/1/93	4145	32646	3279.056	865.944	1058.209	749859.0111	36965.83
13/1/93	4044	32635	3249.565	794.435	865.944	631126.9692	5113.537
14/1/93	4011	32678	3364.848	646.152	794.435	417512.4071	21987.85
15/1/93	4085	32711	3453.321	631.679	646.152	399018.359	209.4677
18/1/93	4017	32749	3555.199	461.801	631.679	213260.1636	28858.53
19/1/93	3996	32559	3045.809	950.191	461.801	902862.9365	238524.8
20/1/93	4047	32419	2670.469	1376.531	950.191	1894837.594	181765.8
21/1/93	4094	32530	2968.06	1125.94	1376.531	1267740.884	62795.85
22/1/93	4062	32568	3069.938	992.062	1125.94	984187.0118	17923.32
25/1/93	4117	32923	4021.693	95.307	992.062	9083.424249	804169.5
26/1/93	4207	32989	4198.639	8.361	95.307	69.906321	7559.607
27/1/93	4287	32913	3994.883	292.117	8.361	85332.34169	80517.47
28/1/93	4279	33062	4394.352	-115.352	292.117	13306.0839	166031
29/1/93	4383	33100	4496.23	-113.23	-115.352	12821.0329	4.502884
1/2/93	4551	33321	5088.731	-537.731	-113.23	289154.6284	180201.1
2/2/93	4748	33286	4994.896	-246.896	-537.731	60957.63482	84585
3/2/93	4787	33737	6204.027	-1417.027	-246.896	2007965.519	1369207
4/2/93	4816	34167	7356.857	-2540.857	-1417.027	6455954.294	1262994
5/2/93	4671	34424	8045.874	-3374.874	-2540.857	11389774.52	695584.4

8/2/93	4863	34375	7914.505	-3051.505	-3374.874	9311682.765	104567.5
9/2/93	4972	34145	7297.875	-2325.875	-3051.505	5409694.516	526538.9
10/2/93	4943	34124	7241.574	-2298.574	-2325.875	5283442.433	745.3446
11/2/93	5128	34226	7515.036	-2387.036	-2298.574	5697940.865	7825.525
12/2/93	5244	33924	6705.374	-1461.374	-2387.036	2135613.968	856850.1
16/2/93	5302	33094	4480.144	821.856	-1461.374	675447.2847	5213139
17/2/93	5756	33121	4552.531	1203.469	821.856	1448337.634	145628.5
18/2/93	5760	33021	4284.431	1475.569	1203.469	2177303.874	74038.41
19/2/93	5655	33221	4820.631	834.369	1475.569	696171.6282	411137.4
22/2/93	5922	33429	5378.279	543.721	834.369	295632.5258	84476.26
23/2/93	5876	33232	4850.122	1025.878	543.721	1052425.671	232475.4
						SUM OF $(R_t)^2$	SUM OF $(R_t-R_{t-1})^2$
						242410602.3	49421264
					DW Statistics	0.203874	

DATE	ISE	NYSE	Y	R_t	R_{t-1}	R_t square	R_t-R_{t-1} square
24/2/93	6091	33565	5742.895	348.105		121177.091	
26/2/93	5923	33710	6131.64	-208.64	348.105	43530.6496	309965
1/3/93	5650	33554	5713.404	-63.404	-208.64	4020.067216	21093.5
2/3/93	5637	34005	6922.535	-1285.535	-63.404	1652600.236	1493604
3/3/93	5813	34040	7016.37	-1203.37	-1285.535	1448099.357	6751.087
4/3/93	6027	33989	6879.639	-852.639	-1203.37	726993.2643	123012.2
8/3/93	5883	34694	8769.744	-2886.744	-852.639	8333290.922	4137583
9/3/93	5932	34721	8842.131	-2910.131	-2886.744	8468862.437	546.9518
10/3/93	5864	34783	9008.353	-3144.353	-2910.131	9886955.789	54859.95
11/3/93	5654	34570	8437.3	-2783.3	-3144.353	7746758.89	130359.3
12/3/93	5757	34278	7654.448	-1897.448	-2783.3	3600308.913	784733.8
15/3/93	5792	34424	8045.874	-2253.874	-1897.448	5079948.008	127039.5
17/3/93	5620	34267	7624.957	-2004.957	-2253.874	4019852.572	61959.67
18/3/93	5611	34361	7876.971	-2265.971	-2004.957	5134624.573	68128.31
19/3/93	5588	34715	8826.045	-3238.045	-2265.971	10484935.42	944927.9
22/3/93	5656	34634	8608.884	-2952.884	-3238.045	8719523.917	81316.8
29/3/93	5764	34551	8386.361	-2622.361	-2952.884	6876777.214	109245.5
30/3/93	5861	34572	8442.662	-2581.662	-2622.361	6664978.682	1656.409
31/3/93	5864	34351	7850.161	-1986.161	-2581.662	3944835.518	354621.4
1/4/93	6070	34394	7965.444	-1895.444	-1986.161	3592707.957	8229.574
2/4/93	6307	33708	6126.278	180.722	-1895.444	32660.44128	4310465
5/4/93	6544	33791	6348.801	195.199	180.722	38102.6496	209.5835
6/4/93	6740	33775	6305.905	434.095	195.199	188438.469	57071.3
7/4/93	6733	33970	6828.7	-95.7	434.095	9158.49	280682.7
12/4/93	6925	34280	7659.81	-734.81	-95.7	539945.7361	408461.6
13/4/93	6933	34440	8088.77	-1155.77	-734.81	1335804.293	177207.3
14/4/93	6860	34553	8391.723	-1531.723	-1155.77	2346175.349	141340.7
15/4/93	6967	34559	8407.809	-1440.809	-1531.723	2075930.574	8265.355
16/4/93	7341	34786	9016.396	-1675.396	-1440.809	2806951.757	55031.06
19/4/93	6574	34669	8702.719	-2128.719	-1675.396	4531444.581	205501.7
20/4/93	6609	34434	8072.684	-1463.684	-2128.719	2142370.852	442271.6
21/4/93	6921	34394	7965.444	-1044.444	-1463.684	1090863.269	175762.2
22/4/93	6914	34291	7689.301	-775.301	-1044.444	601091.6406	72437.95
26/4/93	7013	33983	6863.553	149.447	-775.301	22334.40581	855158.9
27/4/93	7229	34159	7335.409	-106.409	149.447	11322.87528	65462.29
28/4/93	7570	34135	7271.065	298.935	-106.409	89362.13422	164303.8
29/4/93	7896	34251	7582.061	313.939	298.935	98557.69572	225.12
30/4/93	7807	34275	7646.405	160.595	313.939	25790.75402	23514.38
3/5/93	7805	34464	8153.114	-348.114	160.595	121183.357	258784.8
4/5/93	7580	34461	8145.071	-565.071	-348.114	319305.235	47070.34
5/5/93	7556	34491	8225.501	-669.501	-565.071	448231.589	10905.62
6/5/93	7505	34419	8032.469	-527.469	-669.501	278223.546	20173.09

7/5/93	7383	34371	7903.781	-520.781	-527.469	271212.85	44.72934
10/5/93	7864	34432	8067.322	-203.322	-520.781	41339.83568	100780.2
11/5/93	7812	34687	8750.977	-938.977	-203.322	881677.8065	541188.3
12/5/93	7952	34823	9115.593	-1163.593	-938.977	1353948.67	50452.35
13/5/93	8349	34479	8193.329	155.671	-1163.593	24233.46024	1740458
14/5/93	8276	34430	8061.96	214.04	155.671	45813.1216	3406.94
17/5/93	8229	34496	8238.906	-9.906	214.04	98.128836	50151.81
18/5/93	8024	34443	8096.813	-72.813	-9.906	5301.732969	3957.291
20/5/93	7919	35232	10212.122	-2293.122	-72.813	5258408.507	4929772
21/5/93	7926	34928	9397.098	-1471.098	-2293.122	2164129.326	675723.5
24/5/93	8008	35077	9796.567	-1788.567	-1471.098	3198971.913	100786.6
25/5/93	8201	35166	10035.176	-1834.176	-1788.567	3364201.599	2080.181
26/5/93	8045	35401	10665.211	-2620.211	-1834.176	6865505.685	617851
27/5/93	8096	35548	11059.318	-2963.318	-2620.211	8781253.569	117722.4
28/5/93	8375	35274	10324.724	-1949.724	-2963.318	3801423.676	1027373
7/6/93	8583	35321	10450.731	-1867.731	-1949.724	3488419.088	6722.852
9/6/93	8537	35119	9909.169	-1372.169	-1867.731	1882847.765	245581.7
10/6/93	8687	34917	9367.607	-680.607	-1372.169	463225.8884	478258
11/6/93	8835	35050	9724.18	-889.18	-680.607	790641.0724	43502.7
14/6/93	9760	35146	9981.556	-221.556	-889.18	49087.06114	445721.8
15/6/93	9804	34920	9375.65	428.35	-221.556	183483.7225	422377.8
16/6/93	9660	35116	9901.126	-241.126	428.35	58141.74788	448198.1
17/6/93	9921	35218	10174.588	-253.588	-241.126	64306.87374	155.3014
18/6/93	10460	34947	9448.037	1011.963	-253.588	1024069.113	1601619
21/6/93	11140	35108	9879.678	1260.322	1011.963	1588411.544	61682.19
22/6/93	11276	34975	9523.105	1752.895	1260.322	3072640.881	242628.2
23/6/93	11412	34668	8700.038	2711.962	1752.895	7354737.889	919809.5
24/6/93	11607	34906	9338.116	2268.884	2711.962	5147834.605	196318.1
25/6/93	11338	34908	9343.478	1994.522	2268.884	3978118.008	75274.51
28/6/93	10967	35302	10399.792	567.208	1994.522	321724.9153	2037225
29/6/93	11109	35188	10094.158	1014.842	567.208	1029904.285	200376.2
30/6/93	10778	35160	10019.09	758.91	1014.842	575944.3881	65501.19
1/7/93	11145	35105	9871.635	1273.365	758.91	1621458.423	264663.9
2/7/93	11794	34839	9158.489	2635.511	1273.365	6945918.231	1855442
6/7/93	11328	34499	8246.949	3081.051	2635.511	9492875.265	198505.9
7/7/93	11263	34756	8935.966	2327.034	3081.051	5415087.237	568541.6
8/7/93	10789	35144	9976.194	812.806	2327.034	660653.5936	2292886
9/7/93	10282	35210	10153.14	128.86	812.806	16604.8996	467782.1
12/7/93	10745	35243	10241.613	503.387	128.86	253398.4718	140270.5
13/7/93	10365	35154	10003.004	361.996	503.387	131041.104	19991.41
14/7/93	10144	35425	10729.555	-585.555	361.996	342874.658	897852.9
15/7/93	10443	35509	10954.759	-511.759	-585.555	261897.2741	5445.85
16/7/93	10617	35285	10354.215	262.785	-511.759	69055.95622	599918.4
19/7/93	10450	35352	10533.842	-83.842	262.785	7029.480964	120150.3
20/7/93	10303	35447	10788.537	-485.537	-83.842	235746.1784	161358.9
21/7/93	10166	35554	11075.404	-909.404	-485.537	827015.6352	179663.2

22/7/93	9897	35252	10265.742	-368.742	-909.404	135970.6626	292315.4
23/7/93	9759	35467	10842.157	-1083.157	-368.742	1173229.087	510388.8
26/7/93	9370	35677	11405.167	-2035.167	-1083.157	4141904.718	906323
27/7/93	9071	35654	11343.504	-2272.504	-2035.167	5164274.43	56328.85
28/7/93	9714	35534	11021.784	-1307.784	-2272.504	1710298.991	930684.7
29/7/93	9956	35674	11397.124	-1441.124	-1307.784	2076838.383	17779.56
30/7/93	10077	35394	10646.444	-569.444	-1441.124	324266.4691	759826
2/8/93	10295	35609	11222.859	-927.859	-569.444	860922.3239	128461.3
3/8/93	10032	35612	11230.902	-1198.902	-927.859	1437366.006	73464.31
4/8/93	9868	35520	10984.25	-1116.25	-1198.902	1246014.063	6831.353
5/8/93	9715	35489	10901.139	-1186.139	-1116.25	1406925.727	4884.472
6/8/93	9629	35604	11209.454	-1580.454	-1186.139	2497834.846	155484.3
						SUM OF $(R_t)^2$	SUM OF $(R_t-R_{t-1})^2$
						231291592	45667886
					DW Statistics	0.197447	

DATE	ISE	NYSE	Y	R_t	R_{t-1}	R_t square	R_t-R_{t-1} square
9/8/93	9487	35760	11627.69	-2140.69		4582553.676	
10/8/93	9643	35727	11539.217	-1896.217	-2140.69	3595638.911	59767.05
11/8/93	9821	35833	11823.403	-2002.403	-1896.217	4009617.774	11275.47
12/8/93	9548	35690	11440.02	-1892.02	-2002.403	3579739.68	12184.41
13/8/93	9741	35696	11456.106	-1715.106	-1892.02	2941588.591	31298.56
16/8/93	10199	35791	11710.801	-1511.801	-1715.106	2285542.264	41332.92
17/8/93	10354	35869	11919.919	-1565.919	-1511.801	2452102.315	2928.758
18/8/93	10448	36048	12399.818	-1951.818	-1565.919	3809593.505	148918
19/8/93	10915	36121	12595.531	-1680.531	-1951.818	2824184.442	73596.64
20/8/93	11149	36043	12386.413	-1237.413	-1680.531	1531190.933	196353.6
23/8/93	11189	36062	12437.352	-1248.352	-1237.413	1558382.716	119.6617
24/8/93	11370	36389	13314.039	-1944.039	-1248.352	3779287.634	483980.4
25/8/93	11671	36520	13665.25	-1994.25	-1944.039	3977033.063	2521.145
26/8/93	11776	36481	13560.691	-1784.691	-1994.25	3185121.965	43914.97
27/8/93	12020	36406	13359.616	-1339.616	-1784.691	1794571.027	198091.8
31/8/93	12357	36451	13480.261	-1123.261	-1339.616	1261715.274	46809.49
1/9/93	12171	36451	13480.261	-1309.261	-1123.261	1714164.366	34596
2/9/93	12223	36261	12970.871	-747.871	-1309.261	559311.0326	315158.7
3/9/93	11655	36339	13179.989	-1524.989	-747.871	2325591.45	603912.4
7/9/93	12526	36071	12461.481	64.519	-1524.989	4162.701361	2526536
8/9/93	12725	35889	11973.539	751.461	64.519	564693.6345	471889.3
9/9/93	12838	35894	11986.944	851.056	751.461	724296.3151	9919.164
10/9/93	12948	36216	12850.226	97.774	851.056	9559.755076	567433.8
13/9/93	13555	36342	13188.032	366.968	97.774	134665.513	72465.41
14/9/93	13362	36157	12692.047	669.953	366.968	448837.0222	91799.91
15/9/93	13826	36336	13171.946	654.054	669.953	427786.6349	252.7782
16/9/93	14026	36308	13096.878	929.122	654.054	863267.6909	75662.4
17/9/93	14459	36132	12625.022	1833.978	929.122	3363475.304	818764.4
20/9/93	14126	35758	11622.328	2503.672	1833.978	6268373.484	448490.1
21/9/93	14188	35372	10587.462	3600.538	2503.672	12963873.89	1203115
22/9/93	14502	35470	10850.2	3651.8	3600.538	13335643.24	2627.793
23/9/93	14886	35397	10654.487	4231.513	3651.8	17905702.27	336067.2
24/9/93	15046	35431	10745.641	4300.359	4231.513	18493087.53	4739.772
27/9/93	15386	35677	11405.167	3980.833	4300.359	15847031.37	102096.9
28/9/93	15777	35660	11359.59	4417.41	3980.833	19513511.11	190599.5
29/9/93	15328	35663	11367.633	3960.367	4417.41	15684506.77	208888.3
30/9/93	15079	35551	11067.361	4011.639	3960.367	16093247.47	2628.818
1/10/93	15952	35811	11764.421	4187.579	4011.639	17535817.88	30954.88
4/10/93	16243	35777	11673.267	4569.733	4187.579	20882459.69	146041.7
5/10/93	15862	35872	11927.962	3934.038	4569.733	15476654.99	404108.1
6/10/93	15698	35989	12241.639	3456.361	3934.038	11946431.36	228175.3
7/10/93	15596	35836	11831.446	3764.554	3456.361	14171866.82	94982.93

8/10/93	15439	35847	11860.937	3578.063	3764.554	12802534.83	34778.89
11/10/93	14617	35934	12094.184	2522.816	3578.063	6364600.57	1113546
12/10/93	15241	35931	12086.141	3154.859	2522.816	9953135.31	399478.4
13/10/93	15361	36031	12354.241	3006.759	3154.859	9040599.684	21933.61
14/10/93	15054	36216	12850.226	2203.774	3006.759	4856619.843	644784.9
15/10/93	15194	36297	13067.387	2126.613	2203.774	4522482.852	5953.82
18/10/93	14928	36423	13405.193	1522.807	2126.613	2318941.159	364581.7
19/10/93	14958	36353	13217.523	1740.477	1522.807	3029260.188	47380.23
20/10/92	14981	36451	13480.261	1500.739	1740.477	2252217.546	57474.31
21/10/93	14826	36361	13238.971	1587.029	1500.739	2518661.047	7445.964
22/10/93	14320	36493	13592.863	727.137	1587.029	528728.2168	739414.3
25/10/93	14069	36736	14244.346	-175.346	727.137	30746.21972	814475.6
26/10/93	13954	36724	14212.174	-258.174	-175.346	66653.81428	6860.478
27/10/93	14500	36646	14003.056	496.944	-258.174	246953.3391	570203.2
1/11/93	13935	36926	14753.736	-818.736	496.944	670328.6377	1731014
2/11/93	13638	36976	14887.786	-1249.786	-818.736	1561965.046	185804.1
3/11/93	13633	36473	13539.243	93.757	-1249.786	8790.375049	1805108
4/11/93	14136	36249	12938.699	1197.301	93.757	1433529.685	1217809
5/11/93	14486	36434	13434.684	1051.316	1197.301	1105265.332	21311.62
8/11/93	15085	36479	13555.329	1529.671	1051.316	2339893.368	228823.5
9/11/93	14711	36400	13343.53	1367.47	1529.671	1869974.201	26309.16
10/11/93	14871	36635	13973.565	897.435	1367.47	805389.5792	220932.9
11/11/93	15197	36624	13944.074	1252.926	897.435	1569823.561	126373.9
12/11/93	15177	36845	14536.575	640.425	1252.926	410144.1806	375157.5
15/11/93	15787	36803	14423.973	1363.027	640.425	1857842.603	522153.7
16/11/93	15702	37107	15238.997	463.003	1363.027	214371.778	810043.2
17/11/93	15789	37043	15067.413	721.587	463.003	520687.7986	66865.69
18/11/93	16091	36853	14558.023	1532.977	721.587	2350018.483	658353.7
19/11/93	16526	36940	14791.27	1734.73	1532.977	3009288.173	40704.27
22/11/93	16727	36702	14153.192	2573.808	1734.73	6624487.621	704051.9
23/11/93	16443	36741	14257.751	2185.249	2573.808	4775313.192	150978.1
24/11/93	16721	36875	14617.005	2103.995	2185.249	4426794.96	6602.213
26/11/93	17426	36839	14520.489	2905.511	2103.995	8441994.171	642427.9
29/11/93	18426	36778	14356.948	4069.052	2905.511	16557184.18	1353828
30/11/93	18977	36870	14603.6	4373.4	4069.052	19126627.56	92627.71
1/12/93	18883	36970	14871.7	4011.3	4373.4	16090527.69	131116.4
2/12/93	18675	37021	15008.431	3666.569	4011.3	13443728.23	118839.5
3/12/93	17893	37040	15059.37	2833.63	3666.569	8029458.977	693787.4
7/12/93	17382	37188	15456.158	1925.842	2833.63	3708867.409	824079.1
8/12/93	17335	37345	15877.075	1457.925	1925.842	2125545.306	218946.3

SUM OF $(R_t)^2$	SUM OF $(R_t-R_{t-1})^2$
456035859.8	28147359

DW Statistics	0.061722

APPENDIX 5
Tabulated d Statistic Values

Critical Values for Durbin Watson d Statistic				
	1 percent		5 percent	
n	dL	dU	dL	dU
60	1.38	1.45	1.55	1.62
65	1.41	1.47	1.57	1.63
70	1.43	1.49	1.58	1.64
75	1.45	1.5	1.6	1.65
80	1.47	1.52	1.61	1.66
85	1.48	1.53	1.62	1.67
90	1.5	1.54	1.63	1.68
95	1.51	1.55	1.64	1.69
100	1.52	1.56	1.65	1.69