INTERNATIONAL JOURNAL OF BUSINESS, 7(1), 2002 ISSN:1083-4346

An Investigation of the Day-of-the-week Effect in Korea: Has the Anomalous Effect Vanished in the 1990's?

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ABSTRACT

This study examines the day-of-the-week effect in the Korean Stock Price Index using the OLS as well as the GARCH model during the eight-year period beginning in 1990 as well as during the entire decade of the 1980's. During the 1980's, the day-of-the-week effect is found to be robust and its presence is observed irrespective of the methodology employed. In the 1990's however, the said effect has completely vanished on the Korean Stock Exchange and this finding also is not affected by the methodology used.

JEL: C44, C81, F23, O53

Keywords: Day-of-the-week effect; Korea; Anomaly; GARCH

I. INTRODUCTION

Most equity markets in Asia have experienced roller-coaster rides in the 1990's. The Korean Stock Exchange is no exception. Table 1 exhibits the prices and volumes on the Korean Stock Price Index (KOSPI hereon) in the first eight years of the 1990's. During this period, the highest daily closing of the index was on November 8, 1994 at 1138.75. In about 37 months after that day, on December 12, 1997, the KOSPI closed at 350.68. Thus, in the first eight years of this decade, the Korean stock market experienced a negative average daily return. In contrast, over the decade of the 1980's, the KOSPI rose from 100.15 to 909.72, a nine-fold increase. In that period, the index registered gains in 8 of 10 years. This dissimilarity observed between the market behavior during the 1980's and the 1990's provides an interesting opportunity to reexamine the presence of the day-of-the-week effect in this developing market.

Finance literature contains abundant empirical evidence of equity market indicator returns being dependent on the day of the week. For the U.S. market indicators, the documented findings point out that while the Monday returns tend to be significantly negative and lowest of the week, the returns on the last trading day of the week tend to be significantly positive.[1] Similar evidence has also been reported for other developed markets as well as for the emerging capital market indicators. A large number of these studies have relied on the OLS methodology to arrive at their conclusions. Connolly (1989) questioned this well documented effect based on the distributional properties of the data, which are not found to match the assumptions underlying the OLS technique. Moreover, Connolly also contended that the sample size could distort the interpretation of statistical tests as applied in the studies of stock return anomalies. Employing robust methods, Connolly concluded that the day-of-the-week effect may have severely weakened and probably disappeared since 1975. The findings of the most recent sub-periods in Keim and Stambaugh (1984), Rogalski (1984), Smirlock and Starks (1986) and Condoyanni, et al. (1987) indeed suggest that the intensity of this effect has considerably reduced after 1975. Recent studies by Chang, et al. (1993) and Dubois and Louvet (1996) are in agreement with the Connolly conclusions regarding the U.S. experience.[2]

In most equity markets around the world, a comparable and persistent evidence has been accumulated on the day-of-the-week effect. The empirical evidence has been documented for Finland, France, Germany, Greece, Italy, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom, Canada, Australia, Hong Kong, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, and Thailand.[3,4] Two glaring exceptions have been the equity markets of Israel and Taiwan. In both of these markets, the returns are found to be positive on all days of the week for the periods studied.[5] For the market of interest, namely, Korea, Lee and Chang (1988), Kim (1988), Lee, et al. (1990), and Ho (1990) document pervasive presence of the day-of-the-week effect.[6] The lowest (negative) mean return is reported on Tuesday and the highest and significantly positive return is reported on Saturday, the last business day of the week in Korea. In Lee, et al., the Saturday returns accounted for half of the returns earned over the nine-year period of the 1980's.

Table 1
Information on Prices and Volumes of KOSPI: 1/1990-12/1997

Date	Beg. Index	End. Index	Close (High)	Date	Volume ('000 shares)	Close (low)	Date	Volume ('000 shares)
1/90-12/90	909.72	696.11	928.82	04-Jan-90	18,094	566.27	17-Sep-90	7,176
1/91-12/91	696.11	610.92	763.10	06-Aug-91	50,118	586.51	23-Dec-91	16,750
1/92-12/92	610.92	678.44	691.48	08-Feb-92	28,979	459.07	21-Aug-92	12,812
1/93-12/93	678.44	866.18	874.10	17-Dec-93	47,626	605.93	06-Mar-93	13,376
1/94-12/94	866.18	1027.37	1138.75	08-Nov-94	53,919	855.37	02-Apr-94	27,644
1/95-12/95	1027.37	882.94	1016.77	14-Oct-95	21,592	847.09	27-May-95	9,333
1/96-12/96	882.94	651.22	986.84	07-May-96	63,599	651.22	27-Dec-96	35,103
1/97-12/97	651.22	376.31	792.29	17-Jun-97	59,999	350.68	12-Dec-97	43,935

Base Index Value = 100, January 4, 1980

The use of the robust methodology to detect the day-of-the-week effect has not always resulted in disputing the OLS findings. For example, while Chang, et al. (1993) and Dubois and Louvet (1996) have agreed with Connolly (1989) regarding the lack of robustness in the U.S. day-of-the-week effect[7], they nevertheless found significant effect for numerous other markets, including Canada and Hong Kong. Najand and Yung (1994) have reported the absence of such an effect in the S&P 500 index futures contract when they considered the impact of conditional heteroskedasticity in the returns. In contrast, Easton and Faff (1994), Alexakis and Xanthakis (1995) and Kamath, et al. (1998) have concluded that evidence on the anomalous effect obtained from using robust estimation technique is similar to that obtained from relying on the OLS technique. For the Stock Exchange of Thailand (SET) index as well as its ten industrial sector indices, Kamath, et al. study (1998) reports that the day-of-the-week effect was robust to the methodology employed during the 1980-1994 period.

In view of the aforementioned evidence, the present study attempts to contribute to the rich literature by examining the behavior of KOSPI. The first objective of this study is to investigate if the day-of-the-week effect, widely reported on most equity markets around the world, including for Korea in the previous decade, is present on the

Korean Stock Exchange in the 1990's. The second objective is to determine if the conclusion regarding the presence or the absence of such an effect is dependent on the methodology used to detect it. To fulfill the first objective, this paper relies on the daily return data on the KOSPI over the January, 1990-December, 1997 period and two 48-month sub-periods. To meet the second objective, in addition to the data of the 1990's, this paper also utilizes the daily return data of the entire decade of the 1980's. While we initially rely on the standard OLS methodology, the methodology of choice in the previous studies of the anomalous effect in Korea, we also rely on the robust methodology of GARCH specification in the present investigation. This study finds that in the 1990's, the day-of-the-week effect has completely vanished on the Korean Stock Exchange. This fresh evidence is diametrically opposite of the evidence we find for the 1980's. Moreover, the conclusions, namely, the presence of the day-of-the-week effect in the 1980's and the absence of the same in the 1990's, are unaffected by the methodology employed.

Several factors provide the motivation for the present study. First, the sample periods investigated in the previous studies of the Korean Stock Exchange (for example, Lee, et al. (1990)) as well as in the studies of the other developing markets from Asia (for example, Kamath, et al. (1998)) had not witnessed a negative return except for a few isolated sub-intervals. Additionally, the roller coaster behavior described in Table 1 is unique for the period examined. Second, the evidence presented first by Connolly (1989), and then by Chang, et al. (1993) and Dubois and Louvet (1996) basically challenge the findings reported by utilizing the OLS technique. Thus, it is definitely worthwhile determining if the Korean experience is dependent on the methodology used to uncover it. Third, generally speaking, the literature concerning the Asian stock markets has contended that the day-of-the-week effect observed in these markets is a time-delayed pattern observed in the U.S. markets. The study of KOSPI provides an opportunity to test this commonly held view. Given the disappearance of the said effect in the U.S., the expectation would be that of finding a vanishing anomalous effect in Korea as well.

The remaining paper is organized as follows. Section II describes the data and the methodologies employed in this study. The empirical findings are reported in Section III. A brief summary makes up the final section.

II. DATA AND METHODOLOGIES

This investigation relies on a total of 5,269 daily rates of return computed from the closing prices of the Korean Stock Price Index. Of these observations, 2,925 returns are for the January, 1980-December, 1989 period, and the remaining 2,344 returns are for the 8-year period beginning in January 1990.[8] The daily return, R_t is calculated as follows:

$$R_t = \log(P_t/P_{t-1}) * 100 \quad (1)$$

where P_t and P_{t-1} are the index closing values on days t and t-1, respectively. For the entire period under consideration, the Korean market was open on Saturdays. This fact facilitates a comparison of the findings of the present study with those of the predecessor studies of KOSPI. The Saturday trading practice was terminated on December 7, 1998. Starting on that day, the weekday trading hours were increased from 4 hours to 5 hours per day. The stock market automated trading system (SMATS) was launched in March, 1988. The Korean Stock Exchange opened its Stock Index Futures Market in May, 1996 and its Stock Index Options Market in July, 1997.

Descriptive statistics of the daily returns on the KOSPI are presented in Table 2. In this table, as well as in the tables that follow, the information is provided for the 1980-1989 period and the 1990-1997 period separately to allow a snapshot comparison. In addition, the latest 8-year span is further divided into two 4-year sub-periods. While the mean daily return is positive in the 1980's, the same in all three reported periods in the 1990's is negative. The standard deviation of the returns has increased about 40 percent during the 1990's from the previous decade. As far as the three periods of the 1990's are concerned, the standard deviation is practically unchanged in spite of the turbulence reported in Table 1. The return distribution of KOSPI is found to be negatively skewed in the 1980's as found by So, et al. (1997) and again in the 1994-1997 period. Except for the 1990-1993 period, the return series exhibit substantial Kurtosis similar to those presented by So, et al. (1997) for the previous decade. The level of Kurtosis exhibited in Table 2 for the two main periods studied (1980-1989 and 1990-1997) indicate fatter tails than the normal distribution. This distributional attribute can also be observed from the information contained in Table 3. The Jarque-Bera test statistics presented in Table 2 reject the normality hypothesis at the 1 percent level for the KOSPI return series in all periods. This evidence of fat-tailed, non-normally distributed KOSPI return series is similar to that presented for numerous other international markets by Chang, et al. (1993), Corhay and Rad (1994), Easton and Faff (1994), and Kamath, et al. (1998).

The Box-Pierce Q(23) statistics of the four return series are presented in Table 2. This is a joint test of the null hypothesis that the first 23 autocorrelation coefficients are zero. The statistically significant Q(23) values in the table suggest the presence of the long term linear dependency in the KOSPI return series. However, when the Box-Pierce test statistics are adjusted for heteroskedasticity, the test statistics, Adj Q(23), are not found to be significant. The Box-Pierce statistics for the squared return series up to 23 lags, $Q^2(23)$, are also reported in Table 2. The null hypothesis of conditional homoskedasticity is easily rejected at 1 percent significance level in all four return series in Korea. This strong evidence of linear as well as nonlinear dependencies in the Korean stock index returns is similar to that reported for Australia, Belgium, Canada, France, Italy, Switzerland and Germany by Theodossiou and Lee (1995) and for Thailand by Kamath, et al. (1998).

Table 2
Summary Statistics of Daily Stock Index Returns in Korea[1]: KOSPI 1/1980-12/1997

Period	N	Mean	Std. dev.	Coeff. of skewness	Coeff. of excess kurtosis	Normality test[2,3]	Q(23) statistic	Adj. Q(23) statistic	Q^2(23) statistic
1980-1989	2925	0.03278	0.449	-0.2113	4.2836	447.821***	95.46***	21.63	373.16***
1990-1997	2344	-0.01630	0.617	0.0820	3.6466	392.920***	93.48***	29.71	3856.49***
1990-1993	1172	-1.77E-03	0.619	0.4368	1.1872	223.011***	37.19**	29.70	551.69***
1994-1997	1172	-0.03090	0.616	-0.2773	6.1059	291.492***	131.36***	32.80	2842.68***

1. Return $R_t = \log(P_t/P_{t-1})*100$
2. Normality test is a Jarque-Bera Asymptotic LM Normality test (Chi-Square Goodness of Fit test for normality of residuals).
3. *** and ** represent significance levels of 1 and 5 percent, respectively.

Table 3
A comparison of Korean stock price return distribution with the normal distribution: 1/1980-12/1997

	Interval					
	1 S.D.	**2 S.D.**	**3 S.D.**	**4 S.D.**	**5 S.D.**	**> 5 S.D.**
Normal distri.	0.6826	0.9545	0.9973	0.9999	0.9999	0.0000
1980-1989	0.7593	0.9429	0.9874	0.9966	0.9986	0.0014
1990-1997	0.7769	0.9467	0.9825	0.9940	0.9983	0.0017
1990-1993	0.7457	0.9377	0.9872	1.0000	1.0000	0.0000
1994-1997	0.7944	0.9549	0.9795	0.9881	0.9974	0.0026

Note : The value in each cell of the table represents the cumulative average proportion of observed return falling into the particular standard deviation interval specified.

The non-normal distributional characteristics of the Korean index returns depicted in Table 2 are comparable to those of many other equity markets around the world.[9] While these characteristics do not support the use of the traditional OLS estimation technique, we initially utilize the OLS methodology to ascertain if the results from the OLS methodology for the 1990's are similar to the previously documented OLS results for the Korean market. Moreover, this exercise also facilitates a comparison of findings from the use of the OLS technique with those from employing the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model. Bollerslev's GARCH model (1986) is considered a robust estimation model that captures the time dependence of return variability. The GARCH (p, q) model is given by

$$Y_t = \alpha + \beta X_t + \varepsilon_t,$$

$$\varepsilon_t | \phi_{t-1} \sim N(0, h_t),$$

$$h_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i \varepsilon^2_{t-i} + \sum_{j=1}^{q} \beta_j h_{t-j}, \qquad (2)$$

where ε_t is the regression error term conditional on the information set ϕ at t-1, and h_t is the conditional variance, dependent on past squared errors (return shocks) and lagged conditional variance.

To ascertain the presence of the day-of-the-week effect in the Korean Stock index return data, we utilize the GARCH (1,1) model. Such a model has been demonstrated to provide suitable fit for stock return series by Agkiray (1986), French,

Schwert and Stambaugh (1987) and Corhay and Rad (1994). Since the Korean return series in all three test periods exhibit significant autocorrelations, the mean equation in the GARCH model in this study incorporates an autoregressive component. The GARCH model employed in this study is as follows:

$$R_t = d_0 + d_1 M_t + d_2 T_t + d_3 W_t + d_4 Th_t + d_5 F_t + \beta R_{t-1} + \varepsilon_t \quad (3)$$

$$\varepsilon_t | \phi_{t-1} \sim N(0, h_t), \text{ and}$$

$$h_t = \alpha_0 + \alpha_1 \varepsilon^2_{t-1} + \alpha_2 h_{t-1}$$

where R_t is the daily return, and d_1-d_5 are the dummy variables for Monday through Friday, respectively, and d_0 is the dummy variable for Saturday.

III. EMPIRICAL FINDINGS

The average daily returns and the standard deviations of the daily returns on KOSPI are exhibited in Table 4. The most striking observation of this exhibit is that none of the mean returns is significantly different from zero in the 1990's. Moreover, the returns of all days of the week in the 1990's are smaller than those in the 1980's while the standard deviations show an opposite evidence. In the 1980's, the Saturday mean return is the dominant return coupled with the smallest standard deviation as found in the previous studies of KOSPI. However, in the 1990's, the mean Saturday is not the highest daily return, a striking departure from the previously reported findings for Korea. Actually, the Saturday mean return is found to be marginally negative in the 1990-1997 period as well as in the 1990-1993 sub-period. The mean Thursday return also shows a change from a positive return in the 1980's to a negative return in the 1990's. The similarity of findings in the 1980's and in the 1990's include the positive mean return on Wednesday and the lowest standard deviation of returns on Saturday.

Table 5 contains the results of the day-of-the-week effect testing from the OLS estimation. During the decade of the 1980's, the presence of the said effect is rather glaring and is similar to that noted in the previous studies. However, as we move from the 1980's to the 1990's, the tabulated findings illuminate the differences. In the recent 8-year period, there is no evidence of the day-of-the-week effect in the Korean index return data.

Since the distributional characteristics of the Korean index return series exhibited in Table 2 violate the assumptions underlying the OLS methodology, we present additional evidence on serial correlation in KOSPI in Table 6. The Q(23) pertaining to the OLS errors from the first-order autoregressive model are significant in the 1990-1997 period and in the second four-year period of the 1990's. The table also reveals that the $Q^2(23)$ statistics pertaining to the square of the OLS errors are significant in all periods studied. More importantly, this table reveals that when the Q statistics are adjusted for heteroskedasticity (Adj Q), they are statistically insignificant in all four periods. This finding suggests that the serial dependencies in the Korean

return data could be adequately accounted for by the heteroskedasticity consistent models.

Table 4
Means and standard deviations of stock index returns across the day of the week
KOSPI: 1/1980-12/1997

Period	1980-1989		1990-1997		1990-1993		1994-1997	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Mon	-0.00562	0.52117	-0.02751	0.71702	9.013E-03	0.73475	-0.06576	0.69784
Tues	-0.00335	0.46716	-0.04177	0.63570	6.416E-03	0.59538	-0.08971	0.67153
Wed	0.04195**	0.46570	0.03449	0.57670	0.02197	0.61838	0.04688	0.53356
Thurs	0.01476	0.44525	-0.03385	0.60180	-0.02885	0.62356	-0.03889	0.58057
Fri	0.05174**	0.44203	-4.88E-03	0.65752	0.02991	0.59573	-0.03950	0.71357
Sat	0.09705***	0.32227	-0.02441	0.49212	-0.05004	0.52372	3.097E-04	0.45956

*** and ** represent significance levels of 1 and 5 percent, respectively.

Table 5
Day-of-the-week effects: OLS results
KOSPI 1/1980-12/1997

$$R_t = d_0 + d_1M_t + d_2T_t + d_3W_t + d_4Th_t + d_5F_t + \beta R_{t-1} + \varepsilon_t$$

	d_0	d_1	d_2	d_3	d_4	d_5	β	LL
1980-1989	0.09060***	-0.11252***	-0.09440***	-0.04760	-0.08132***	-0.04172	0.15309***	-1763.74
df=2917	[4.512]	[-3.959]	[-3.327]	[-1.678]	[-2.865]	[-1.470]	[8.356]	
1990-1997	-0.02347	-0.00074	-0.01490	0.06409	-0.01953	0.02441	0.13304***	-2170.67
df=2336	[-0.7584]	[-0.0169]	[-0.3404]	[1.463]	[-0.4448]	[0.5576]	[6.488]	
1990-1993	-0.05158	0.06382	0.05677	0.07402	0.01467	0.08402	0.06760**	-1094.02
df=1164	[-1.157]	[1.023]	[0.9039]	[1.177]	[0.2333]	[1.337]	[2.313]	
1994-1997	0.00751	-0.07724	-0.08338	0.05636	-0.05742	-0.03698	0.20025***	-1066.84
df=1164	[0.1755]	[-1.263]	[-1.373]	[0.9276]	[-0.9408]	[-0.6088]	[6.975]	

a. Statistics in parenthesis are t-statistics.
b. LL represents the log-likelihood value given by the OLS estimations.
*** and ** represent significance levels of 1 and 5 percent, respectively.

Table 6
Autoregressive model: statistics of daily residual series
KOSPI 1/1980-12/1997

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + \varepsilon_t$$

Index	α_0	α_1	Q(23) Statistic	Adj Q(23) Statistic	$Q^2(23)$ Statistic
1980-1989	0.0278***	0.1506***	28.53	22.14	273.56***
	[3.374]	[8.223]			
1990-1997	-0.0146	0.1314***	57.60***	12.56	3,536.48***
	[-1.154]	[6.418]			
1990-1993	-0.0025	0.0656**	32.22	12.15	505.54***
	[-0.1383]	[2.248]			
1994-1997	-0.0254	0.1974***	88.63***	33.08	2,663.18***
	[-1.434]	[6.889]			

*** and ** represent significance levels of 1 and 5 percent, respectively.

Table 7 contains the results from the reexamination of the day-of-the-week effect in the Korean index returns with the GARCH (1,1) model. The coefficients of the six days of the week reported in this table provide evidence that the GARCH (1, 1) results are similar to the OLS results. For the decade of the 1980's, the tabulated results indicate a pronounced presence of the day-of-the-week effect. On the other hand, in the 1990's, the day-of-the-week effect can be seen to have completely disappeared from the Korean stock market indicator data. The likelihood ratio (LR) for the relative fit of the model supports the contention that the GARCH (1, 1) model is more appropriate than the OLS model in all four periods studied. The sum of the parameters, α_1 and α_2 are found to be 0.933, 0.948, 0.901, and 0.977 in the estimations of 1980-1989, 1990-1997, 1990-1993, and 1994-1997 periods, respectively. These values approaching 1.00 implies that shocks to volatility persist over time.

Our findings strongly suggest that the strong presence of the said anomalous effect in the 1980's and the total absence of the same in the 1990's are not dependent on the methodology employed. In this regard, our findings are in agreement with the findings reported by Easton and Faff (1994), Alexakis and Xanthakis (1995) and Kamath, et al. (1998).

Table 7
Day-of-the-week effect: GARCH (1, 1) results
KOSPI 1/1980-12/1997

$$R_t = d_0 + d_1M_t + d_2T_t + d_3W_t + d_4Th_t + d_5F_t + \beta R_{t-1} + \varepsilon_t$$
$$\varepsilon_t|\phi_{t-1} \sim N(0, h_t),$$
$$h_t = \alpha_0 + \alpha_1\varepsilon^2_{t-1} + \alpha_2 h_{t-1}$$

	d_0	d_1	d_2	d_3	d_4	d_5	β	α_0	α_1	α_2	LL	LR
1980-1989	0.071***	-0.118***	-0.085***	-0.074***	-0.047***	-0.031	0.104***	0.018***	0.230***	0.703***	-1525.02	477.44***
	[4.336]	[-5.416]	[-3.696]	[-3.221]	[-2.044]	[-1.324]	[4.821]	[7.917]	[9.938]	[27.93]		
1990-1997	-0.00729	0.01031	-0.01507	0.03529	-0.02123	0.02537	0.09059***	2.41E-02***	0.16442***	0.78281***	-1815.80	709.74***
	[-0.3039]	[0.3090]	[-0.4465]	[1.048]	[-0.6294]	[0.7517]	[4.042]	[4.545]	[8.491]	[32.25]		
1990-1993	-0.05231	0.04921	0.03389	0.08948	0.01929	0.06616	0.01384	4.60E-02***	0.2508***	0.65037***	-983.93	220.18***
	[-1.446]	[0.9906]	[0.6638]	[1.766]	[0.3794]	[1.300]	[0.4232]	[4.166]	[6.536]	[13.77]		
1994-1997	0.01704	-0.03593	-0.05824	0.00797	-0.03768	0.00719	0.16210***	1.09E-02**	0.11496***	0.86174***	-816.13	501.42***
	[0.5448]	[-0.8143]	[-1.323]	[0.1809]	[-0.8547]	[0.1633]	[5.265]	[2.180]	[5.502]	[32.35]		

a. Statistics in parenthesis are t-statistics.
b. LL represents the log-likelihood value given by the GARCH (1, 1) estimations; LR represents log-likelihood ratio.
c. *** and ** represent significance levels of 1 and 5 percent, respectively.

Since we have uncovered diametrically opposite evidence in the 1980's and 1990's with respect to the day-of-the-week effect, the next logical step is to visualize the possible factors, which might have contributed to such a reversal. Statistically speaking, the culprit is Saturday. In the previous investigations of the Pacific Basin markets in general and the Korean market in particular, the very large and significantly positive return on the last trading day of the week, namely, on Saturdays, was the primary cause of the day-of-the-week effect. However, as seen in Table 4, the Saturday return has ceased to be the dominant return in the 1990's. In fact, in the 8-year period (1990-1997) investigated in this paper, the Saturday mean return is negative. For all practical purposes, the mean returns on all days of the week are not statistically different from zero.

As noted earlier, in the 1980's, the evidence on the KOSPI returns displayed the lowest return of the week, actually a negative return, on Tuesdays and the highest as well as a significantly positive return on Saturdays.[10] This Tuesday-Saturday pattern in Korea was comparable to the Monday-Friday pattern observed in the U.S. The differences in the two markets with respect to the days was thought to be reflecting the time difference between the working hours of the NYSE and the Korean Stock Exchange. Thus, if the Korean market was simply reflecting the U.S. pattern with a time delay, the recent evidence of the disappearance of the day-of-the-week effect in the U.S. equity markets presented by Chang, et al. (1993) and Dubois and Louvet (1996) would signal a similar pattern for the Korean Stock market. Yet another plausible reason for the contrary evidence emerging from the present study is that in all three periods of 1990's examined, the mean daily return is negative unlike in the previous investigations. In addition, the variability of daily returns is much higher in the 1990's than in the previous years. It is not possible to pinpoint a single cause or a combination of causes that might have helped to eradicate the day-of-the-week effect. The introduction of futures index and the options index in the second half of 1990's could not have affected the results reported in this paper. However, the effects of these introductions would have to be considered in the future years.

IV. SUMMARY

This study examines the Korean stock price index data over a 18-year span beginning in January, 1980. The objective of the paper are: i) to ascertain if the day-of-the-week effect has continued to persist in the Korean equity index in the 1990's as it had been in the 1980's; and ii) to determine if the findings with respect to this anomalous effect in both decades are methodology specific. The Korean stock index return series are found to be leptokurtic in all four intervals examined in this study (1980-1989, 1990-1997, 1990-1993 and 1994-1997). Moreover, the distributional characteristics exhibit both, linear as well as nonlinear dependencies. In the first ten-year period, the Saturday return is large, positive, significant and dominant as found in previous studies. However, in the 1990's, the Saturday mean return is found to be small, negative, and insignificant. In the 1990's study periods, all the daily mean returns are found to be

statistically insignificant. While mean daily return in the 1980's decade is found to be positive, the same in all three-test periods of 1990's is found to be negative.

In the 1980's, the day-of-the-week effect is found to be handsomely present. In the 8-year period following 1989 however, the day-of-the-week effect is found to completely vanish. Moreover, these conclusions emerging from the present investigation are unaffected by the methodology employed. For the most recent 8-year period, the evidence presented here for the Korean equity market is similar to the evidence for the U.S. as well as numerous other developed markets.

NOTES

1. See for example French (1980), Gibbons and Hess (1981), Keim and Stambaugh (1984), Jaffe and Westerfield (1985), Lakonishok and Smidt (1988), and Condoyanni, O'Hanlon and Ward (1987).
2. Chang, Pinegar and Ravichandran (1993) find that the said effect becomes insignificant in the U.S. when adjustment is made for either the sample size or the error term, however, they find that this effect is robust to adjustments for the seven European equity markets as well as in Canada and Hong Kong. Dubois and Louvet (1996) findings echo the sentiments of Chang, et al (1993).
3. See Aggarwal and Rivoli (1989), Alexakis and Xanthakis (1995), Barone (1990), Chang, et al. (1993), Condoyanni, et al. (1987), Dubois and Louvet (1996), Easton and Faff (1994), Ho (1990), Jaffe and Westerfield (1985), Kamath, et al. (1998), Kamath and Sitthichaikasem (1995), Kim (1998), Lee, et al. (1990), Martikainen and Puttonen (1996), Solnik and Bousquet (1990) and Wong, et al. (1992). The Kamath, et al. paper (1998) presents a table of empirical findings for 13 countries.
4. While Chang, et al. (1993) find robust presence of the said effect in Spain, Santesmases (1986) did not detect such presence in Spain.
5. See Lauterbach and Ungar (1992) for a study of the Israeli equity market. For the findings on Taiwan, see Ho (1990), Lee, et al. (1990) and Wong, et al. (1992).
6. The periods studied in these four studies are 1976-1985, 1980-1984, 1980-1988, and 1975-1987, respectively. Ho and Cheung (1994) found the evidence of the day-of-the-week effect in the volatility of returns in Korea over the 1975-1989 period.
7. Wilson and Jones (1993) found day-of-the-week effect present in all four U.S. indices (S&P, NYSE, AMEX and NASDAQ) when they utilized a model which incorporated serial correlation and corrected for the non-normality of the data.
8. The daily price data of KOSPI for the 1990's was purchased from the Korean Stock Exchange. The data of the previous decade was obtained from the website of the Korean Stock Exchange, namely, www.kse.or.kr.
9. These characteristics are comparable to those presented by Agkiray (1989), Corhay and Rad (1994), Easton and Faff (1994), Alexakis and Xanthakis (1995), Theodossiou and Lee (1995), So, et al. (1997) and Kamath, et al. (1998) for equity markets in north America, Europe, Asia and Australia.

10. In this study, we did not find Tuesday mean return to be the lowest during the 1980's. The period studied in this paper does not exactly match that studied in other studies (see endnote #6).

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