Stock Market Efficiency: Evidence from Pakistan

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Abstract

Stock traders and potential and smart investors closely watch track-record of all listed companies on stock exchanges to make sure if future rate of return could be predicted on the basis of past data. To help the investors predict future rate of return, we analyzed the stock market's efficiency using ARMA and GARCH models. This study focused on the weak form efficiency of stock markets with the intention that if it is verified only then strong forms can be tested. The results, shown in the tables and graphs, indicate that the daily, weekly and monthly returns for KSE-100 index are stationary at their levels. Stationarity of rates of return series goes against the weak form efficiency. It means that future rate of return can be predicted to some extent on the basis of past data either by ARMA models or by GARCH models or by both. We found that the Efficient Market Hypothesis does not hold, so far, at both micro and macro levels in case of the Karachi Stock Exchange in Pakistan. The main contribution of this study is that it tests the Efficient Market Hypothesis for daily, weekly and monthly returns; from July 1995 to December 2007, on the premier stock exchange of the country in context of Pakistan that is KSE-100.

Keywords: *Stock Market, Efficiency, KSE-100, ARMA, ARCH, GARCH*

1. Introduction

Stock market of a country is generally considered to be the barometer of its economic health. It is due to the belief that stock traders and potential investors, or at least a small group of them so-called 'smart (professional) investors', closely watch track-record of all listed companies on stock exchanges or on over-the-counter stock markets. As soon as fundamentals of a listed firm, like its expected cash flows or members of its management team, change vigilant investors immediately incorporate such changes in its stock price. That is, a healthy change in fundamentals leads to a surge in its stock price whereas a gloomy change depresses its stock price. Since leading companies of each sector in an economy are mostly listed on one or another stock market of the country, therefore performance of stock prices duly indicates economic fundamentals of corporate sector of the country. The Karachi stock market is one of the leading emerging markets. This feature of the KSE indicates a shallow market with high turnover, common features amongst emerging stock markets (Nishat and Mustafa, 2007).

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1.1. Background of the Study

To put it differently, when stock prices strictly follow economic fundamentals; which change absolutely randomly, then the future stock prices become unpredictable on any basis. Arguably, stock prices instantaneously incorporate every 'news' about fundamentals in stock prices and since every news has to be new and unpredictable by definition, therefore future stock prices should also be unpredictable. This interpretation of stock markets is well known by 'Efficient Market Hypothesis' in finance and economic literature.

For pedagogical reasons, Fama (1965) has defined Efficient Market Hypothesis at three different levels; weak form efficiency, semi-strong form efficiency and strong form efficiency. Weak form efficiency means that current security prices fully reflect information released in the past. Therefore, data on past price movements of a security or time-series analysis of past stock prices should be of no help to predict its future prices.

Majority of investors in any economy are supposedly middle-income people and most of them are not finance professionals. Therefore, they do not posses required expertise, time and resources to figure out any possible patterns for future stock prices so that they can make money on the basis of such analysis.

Then naturally, they feel encouraged and secure to invest their hard-earned money in stock markets if they are convinced that the Efficient Market Hypothesis prevails in some form in these markets. In other words, common investors willingly invest in stock markets only if they have the assurance that there is no one in the market who can beat the market by predicting future stock prices on some basis. Otherwise if they have any glimpse of inefficiency in capital markets, they shy away of capital markets.

1.2. Problem Statement

In past studies cited in the review of literature, the emphasis has been on testing mere efficiency and on empirical analysis. Some of the studies (e.g. Solnik, 1973 and Fama, 1965) have been used as an input into the rigorous test evaluation techniques. Since long-horizon returns are measured over years, rather than days or weeks; there is fewer data points available, making precise statistical inference difficult.

This study will set out to redress these issues and explicitly use time series techniques solely for testing efficiency purposes. The efficient market hypothesis is concerned with the behavior of prices in asset markets. We provide a selective exercise on the efficient market hypothesis. A Generalized Autoregressive Conditional Hetroscedestic, GARCH (p, q) model is utilized to test the efficiency of the stock returns.

1.3. Study Objectives

The main objective of this study is to evaluate efficiency of Karachi Stock Exchange, the largest stock market in the country. For this purpose the latest daily, weekly and monthly data of Karachi Stock Exchange 100 Index (KSE-100) from July 1995 to December 2007 has been used and for unit root test, ARMA and GARCH methods are used.

The steps involve in the research are:

i) Before testing the predictability of KSE-100, Unit root test is applied first to ascertain the stationarity of the data.

ii) We then applied ARMA Models to test the predictability of overall stock prices of Karachi Stock Exchange 100 Index (KSE-100).

iii) Finally, to test the predictability at macro levels, we applied autoregressive technique through GARCH models and diagnosed the data by applying Hetroscadesticity Test.

2. Literature Review

There is an extensive literature on testing the efficient market hypothesis. Moreover, a number of recent studies have analyzed the behavior of emerging equity markets.

2.1. Literature on Developed Countries

In early literature, debate on the Efficient Market Hypothesis was done in terms of the random walk model i.e. to assert whether or not successive price changes are independent. Moore (1962) examined the weekly changes of 29 randomly selected stocks listed in the New York Stock Exchange (NYSE) over the period of 1951-58. Fama (1965) calculated correlation coefficients on the daily returns for the 30 US companies that make up the Dow Industrial Index from January 1958 to September 1962. Solnik (1973) investigated 234 stocks from major European stock markets by testing correlated return patterns of individual shares for various data frequencies, and found that they were efficient, but less so than the US market. Jung and Shiller (2002) tested Samuelson's dictum regarding 'micro' and 'macro' efficiency of the stock market.

2.2. Literature on Emerging Countries

Emerging markets have received attention from researchers and many studies have been conducted in order to test their efficiency in recent years. Samuels and Yacout (1981) used weekly share prices of 21 companies on the Nigerian Stock Exchange from July 1978 to July 1979 for calculating serial correlation coefficients. Ayadi (1983) collected data from Nigerian Stock Exchange for 30 companies for the period from January 1977 to December 1980. Wong and Kwong (1984) conducted serial correlation tests for the daily closing prices of 28 Hong Kong stocks. Butler and Malaikah (1992) used runs tests and serial correlation tests in order to examine the weak-form efficiency in the stock markets in Kuwait and Saudi Arabia. Their study found evidence of inefficiency in the Saudi Arabian Stock market but not in the Kuwaiti Market.

2.3. Literature on Pakistan

Till late 1980s, the equity markets of Pakistan were a neglected area of research. However, the first half of the 1990s saw developing interest amongst researchers about the Pakistani equity market. Since then, there have been a number of studies conducted

on the Pakistani equity markets. Uppal (1994) extended the earlier paper by Jun and Uppal (1994) and examined the stochastic properties of stock returns. The study used the weekly general index from the period April 1998 to June 1994. Farid and Ashraf (1995) randomly selected 10 companies from the Karachi Stock Exchange to study the effect of the volume of trading on the volatility of stock prices. Hameed and Ashraf (2006) used GARCH to model volatility and test for weak-form efficiency of the stock returns. They observed the impact of SECP reforms, as captured by introduction of circuit breakers, on return volatility and concluded that the impact of circuit breakers on the volatility of returns has a damping effect although on a very small magnitude.

From the above review of literature we can conclude that the Efficient Market Hypothesis has been tested extensively both in the developed and emerging markets with mixed results. Initially, linear tests were generally used for testing the efficiency of stock markets, however of late, researchers have developed interest in the non-linear properties of the stock returns and thus non-linear tests have now also been used to test efficiency. This study is different from the above-cited literature because it employs both linear and non-linear tests on the latest daily, weekly and monthly data of Karachi Stock Exchange 100 Index (KSE-100) from July 1995 to December 2007

Nishat and Mustafa (2007) in their study 'Testing for Market Efficiency in Emerging Markets: A Case Study of the Karachi Stock Market', investigated the efficiency of the Karachi Stock Exchange (KSE) with corrections for thin trading and non-linearity. To test for efficiency in the Karachi stock market, they used the methodology proposed by Miller, Muthuswamy and Whaley (1994) taking into consideration thin trading, non-linearity, and structural changes. The empirical results indicated that, without taking into consideration thin trading and non-linearity, the Karachi stock market was inefficient in all three types of data. This implies that the Karachi stock market did not follow the random walk model. However, when the returns were adjusted for thin trading and non-linearity, the Karachi stock market revealed efficient behavior and followed the random walk model.

Salman and Mustafa (2001) Tested Semi-Strong Form Efficiency of Stock Market. In their study they examined the linkage of news published in daily Business Recorder and Dawn with aggregate stock market activity measured by market returns and trading volume. They found that at aggregate level the news surprises and number of news both are negatively related to stock market activity in Pakistan. This relationship is statistically significant in case of trading volume but insignificant in case of stock returns. The analysis points to the difficulties in finding observable relationship between public information and market activity and that this relationship may not be simple.

3. Data and Methodology

3.1. Data

The data used in the study consists of daily, weekly and monthly closing prices of KSE from July 1995 to December 2007. The source of collected data is mainly secondary. It has been obtained from the Karachi Stock Exchange website www.kse.com.pk and the Daily Business Recorder website i.e. www.brecorder.com.

After collecting the data on prices, the daily, weekly and monthly returns on the asset prices and the KSE-100 index are calculated by taking first difference of their natural logarithms.

$$R_t = Log\ (P_t / P_{t-1})$$

OR

$$R_t = Log\ P_t - Log\ P_{t-1}$$

Where R_t is the rate of return on the underlying stock at time t, P_t is the price of the stock at time t and P_{t-1} is the price of the stock at time t-1.

3.2. Methodology

Weak form efficiency means that future prices/returns cannot be predicted using their past values or time series data. Most of the econometric tests associated with weak-form efficiency are based on time series analysis. In time series analysis, the random walk hypothesis is tested against any specific pattern of existing data; if it exists at all. Generally autoregressive model is used to test the random walk hypothesis or weak form efficiency of Efficient Market Hypothesis.

3.3. Estimation Procedure

Initially, stationarity of the financial time series data will be detected using the Augmented Dickey-Fuller (ADF) test. If the data are found to be stationary, then the ARMA model will be fitted first. If the data follow any of ARMA processes then we will conclude that some linear pattern of predictability can be detected.

For the purpose of detecting the ARMA patterns the study will use the Box-Jenkins procedure [(Box and Jenkins (1976)]. Using the Box-Jenkins methodology, correlograms will be initially drawn and a tentative decision on the Autoregressive (AR) and Moving Average (MA) terms will be made on the basis of Autocorrelation (AC) and Partial Autocorrelation (PAC) functions. The ARMA model will be estimated and correlograms of the regression residuals will again be drawn. If any of the AC or PAC will still be significant at 5 % level of significance then the significant AR and/or MA processes will be fitted accordingly and the equation will be re-estimated.

The study will also see whether or not any non-linear pattern is also present through the application of GARCH models. If any version of this model fits to the time series data, then it will confirm that the data are predictable in non-linear manner hence weak-form efficiency will be rejected.

Thus the residuals and squared residuals of the resulting equation will be studied. If any of the AC or PAC is still significant at 5 % level of significance than the significant ARMA and/or Autoregressive Conditional Hetroscedestic (ARCH)/Generalized Autoregressive Conditional Hetroscedestic (GARCH) processes will be fitted accordingly

and the equation will be re-estimated. The patterns of the residuals generated will again be studied through AC and PAC functions. The step wise procedure for finding the appropriate ARMA and ARCH/ GARCH model will be continued until the regression residuals approximated white noise.

4. Estimation and Results

4.1. Results of Unit Root Tests

As stationarity is a prerequisite for the application of GARCH models, therefore, the study started analysis with the detection of seasonality through the application of Augmented Dickey-Fuller test on daily, weekly and monthly returns of KSE-100 index. The results are presented in the table-1 below:

Table: 1 Results of Stationarity of data

Time Period	ADF test statistics*	Stationarity at
Daily	-50.2674	Level
Weekly	-17.5436	Level
Monthly	-12.6118	Level

Source: www.kse.com.pk; www.brecorder.com

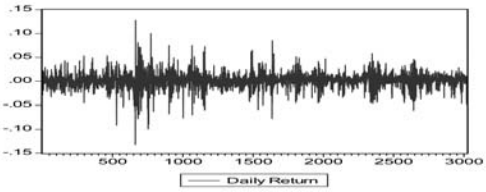
Note: Stationarity is checked for the calculated returns.
*Critical values at 5% level of significance are -2.8623, -1.9413 and -3.4413 for daily, weekly and monthly returns respectively.

The results of stationarity indicate that daily, weekly and monthly returns for KSE-100 index are stationary at their levels. In other words, they are integrated of order zero presented as I (0). Stationarity of rates of return series goes against the weak form efficiency. It means that future rate of return can be predicted to some extent on the basis of past data either by ARMA models or GARCH models or by both. Hence, both linear and non-linear models are applied to find out predictive power of past data.

Table: 2 ARMA Results of Stock Returns

	Daily		Weekly		Monthly	
	AR(1)	MA(1)	AR(1)	MA(5)	AR(4)	MA(5)
Co-efficient	0.8382	0.7812	0.3631	-0.0928	0.6998	-0.7030
Standard Error	0.0590	0.0675	0.0366	0.0392	0.1048	0.1327
t-statistics	14.2023	-11.5820	9.9118	-2.3654	6.6789	-5.1970
probability	0.0000	0.0000	0.0000	0.0183	0.0000	0.0101

4.2. Results of Linear Models

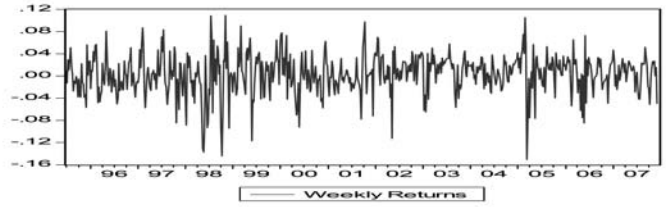


After considering all the AR and MA models, the following patterns were detected in the returns of the KSE-100 index. It can also be concluded from the results (table 2) that Samuelson's (1998) **Daily Data source: www.kse.com.pk; www.brecorder.com.** Observe that stock market is 'micro efficient' has some truth in case of Pakistani stock market, if only linear behavior of the stock returns is analyzed.

On the other hand, results of weekly and monthly data show that for their returns either one or a combination of ARCH and GARCH is present. These results indicate that returns in the Pakistani equity market are characterized by non-linear behavior. From the combined results (table 2 & 3) of both the linear and non-linear models, we can conclude that since data generating process is present for daily, weekly and monthly returns, therefore, in general, the KSE-100 index is weak form inefficient. The results obtained are similar to the results in the studies by Chakraborty (2006), Hameed and Ashraf (2006) and Nishat and Mustafa (2007).

Table: 3 ARCH/GARCH Model Test Results

	Daily		Weekly		Monthly	
	ARCH(1)	GARCH(1)	ARCH(1)	GARCH(1)	ARCH(1)	GARCH(1)
Co-efficient	0.1778	0.7782	0.3599	0.5789	0.0329	0.8212
Standard Error	0.0107	0.0083	0.1063	0.1648	0.0469	0.2805
z-statistics	16.5445	93.3313	3.3859	3.5124	0.6630	2.9271
probability	0.0000	0.0000	0.0007	0.0004	0.5073	0.0034



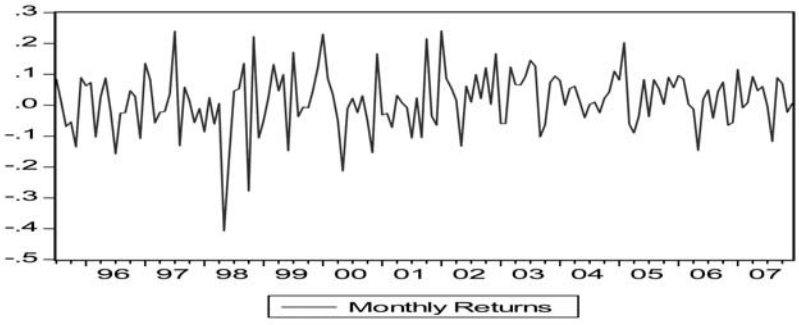
Weekly Data Source: www.kse.com.pk; www.brecorder.com

4.3 Results of Non-Linear Models

Table: 4 Hetroscadesticity Test Results

LM Test at lag(1)	F-statistics	R-squared	Adj. R-squared	Alkaike info criterion	Durbin Watson Stat
Daily	2.7918	0.00094	-0.00006	-5.2779	1.9976
Weekly	0.0599	0.00009	-0.00454	-4.0027	1.9973
Monthly	1.2979	0.00645	-0.02194	-1.8580	1.9810

During the diagnosis of the data, it is found that the Durbin Watson statistics, lying between the range 1.98-1.99, implying that the data do not have any autocorrelation problem. There is no econometric problem in this study. There is no serious multicollinearity problem. There might be non-linear predictability patterns present in the return series that might not be captured in the AR, MA or ARMA processes. Therefore the study built up the series of ARCH models. Presence of any of the non-linear models, i.e. either ARCH or GARCH, will imply that the returns are predictable in a non-linear manner and the returns will not be weak form efficient. After considering all the AR, MA, ARMA, ARCH and GARCH models, the following patterns were detected in the monthly returns of the KSE-100 index.



Monthly Data source: www.kse.com.pk; www.brecorder.com

The results, shown in the above tables and graphs, indicate that daily, weekly and monthly returns for KSE-100 index are stationary at their levels. Stationarity of rates of return series goes against the weak form efficiency. The analysis done so far divulge that a data generating process can be identified to predict future returns in the Karachi Stock Exchange for most of the market index as well. We examined daily, weekly and monthly data for uncorrelated returns (linear models) at the KSE-100 index (see Table 2 and 3). This implies that the stock market does not follow a random walk in daily, weekly and monthly data. To consider the impact of non-linear returns due to less informed investors biased forecasts of investors, and neutral risk behavior, the non-linear model has also been estimated on the basis of daily, weekly and monthly data. The results are presented in Tables 2, 3, and 4, which indicate that the KSE is inefficient when tested with a non-linear model.

5. Conclusion and Recommendations

The intention of the study was to test the Efficient Market Hypothesis in Pakistan. For this purpose the premier stock exchange of Pakistan, that is, the Karachi Stock Exchange was selected. Since efficiency of stock markets is defined at three levels; weak, semi-strong and strong, this study focused on the first level that is the weak form efficiency of stock markets with the intention that if it is verified only then strong forms can be tested.

The daily, averaged weekly and month-end price data of KSE-100 index were used to calculate rates of return. Testing was based on time series analysis of data i.e. stationarity of rates of returns was examined using the Augmented Dickey Fuller (ADF) test statistic. The results of this test indicted that all the returns were stationary at the level for daily, weekly and monthly data. It implied that future returns were somewhat predictable on the basis of past data. Therefore, both linear and non-linear model were used for data generation processes. The results of linear and non-linear estimation together reveal that a data generating process can be identified, to predict future returns in the Karachi Stock Exchange, for most of the market index as well. These results also turn down the idea of Samuelson (1998) 'micro efficiency' and 'macro inefficiency.' This leads to the conclusion that the Efficient Market Hypothesis does not hold, so far, at both micro and macro levels in the case of the Karachi Stock Exchange in Pakistan. The above results indicate that proper measures need to be taken in order to improve informational efficiency and thereby assist potential investors to invest in securities that are correctly priced. In short, policy makers have to go a long way to achieve even the weak-form efficiency level in Pakistan. There should be a proper database through which all the companies should be obliged to improve the quality of information provided to potential investors.

Correlogram of Daily returns

Sample: 1 3020
Included observations: 3019

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
|* |	|* |	1	0.087	0.087	22.979	0.000
| |	| |	2	0.031	0.024	25.875	0.000
| |	| |	3	0.047	0.042	32.456	0.000
| |	| |	4	0.002	-0.006	32.472	0.000
| |	| |	5	0.027	0.025	34.600	0.000
| |	| |	6	0.007	0.000	34.731	0.000
| |	| |	7	0.042	0.041	40.017	0.000
| |	| |	8	0.047	0.038	46.711	0.000
| |	| |	9	0.059	0.050	57.192	0.000
| |	| |	10	-0.001	-0.016	57.194	0.000
| |	| |	11	0.010	0.006	57.506	0.000
| |	| |	12	0.010	0.003	57.823	0.000
| |	| |	13	-0.002	-0.004	57.833	0.000
| |	| |	14	-0.000	-0.005	57.833	0.000
| |	| |	15	-0.015	-0.018	58.537	0.000
| |	| |	16	0.000	-0.003	58.537	0.000
| |	| |	17	0.035	0.032	62.190	0.000
| |	| |	18	0.009	0.003	62.444	0.000
| |	| |	19	-0.007	-0.010	62.595	0.000
| |	| |	20	-0.024	-0.026	64.298	0.000
| |	| |	21	-0.028	-0.025	66.746	0.000
| |	| |	22	-0.022	-0.016	68.184	0.000
| |	| |	23	-0.027	-0.020	70.399	0.000
| |	| |	24	-0.041	-0.035	75.544	0.000
| |	| |	25	-0.024	-0.018	77.245	0.000
| |	| |	26	0.034	0.039	80.785	0.000
| |	| |	27	-0.002	-0.001	80.803	0.000
| |	| |	28	-0.019	-0.014	81.894	0.000
| |	| |	29	-0.008	-0.002	82.069	0.000
| |	| |	30	-0.020	-0.012	83.276	0.000
| |	| |	31	-0.032	-0.023	86.321	0.000
| |	| |	32	0.017	0.031	87.180	0.000
| |	| |	33	0.041	0.045	92.309	0.000
| |	| |	34	-0.017	-0.025	93.143	0.000
| |	| |	35	0.008	0.004	93.334	0.000
| |	| |	36	-0.002	-0.002	93.347	0.000

Correlogram of Weekly returns

Date: 07/07/08 Time: 15:28
Sample: 7/01/1995 12/28/2007
Included observations: 650

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
.|*** |	.|*** |	1	0.352	0.352	81.031	0.000
.|* |	.|. |	2	0.132	0.009	92.356	0.000
.|. |	.|. |	3	0.006	-0.049	92.380	0.000
.|. |	.|. |	4	-0.051	-0.045	94.094	0.000
*|. |	*|. |	5	-0.095	-0.066	100.03	0.000
.|. |	.|. |	6	-0.032	0.032	100.70	0.000
.|. |	.|. |	7	-0.014	-0.004	100.84	0.000
.|. |	.|. |	8	-0.009	-0.011	100.89	0.000
.|. |	.|. |	9	0.013	0.015	101.00	0.000
.|. |	.|. |	10	-0.018	-0.037	101.21	0.000
.|. |	.|. |	11	0.001	0.018	101.21	0.000
*|. |	*|. |	12	-0.066	-0.078	104.11	0.000
.|. |	.|* |	13	0.036	0.093	104.97	0.000
.|. |	.|. |	14	-0.001	-0.035	104.97	0.000
.|. |	.|. |	15	-0.007	-0.014	105.00	0.000
.|. |	.|. |	16	-0.003	0.006	105.01	0.000
.|. |	.|. |	17	0.011	0.005	105.10	0.000
.|. |	.|. |	18	-0.025	-0.026	105.53	0.000
.|. |	.|. |	19	-0.002	0.014	105.54	0.000
.|. |	.|. |	20	0.031	0.032	106.19	0.000
.|. |	.|. |	21	0.030	0.015	106.81	0.000
.|. |	*|. |	22	-0.030	-0.068	107.44	0.000
.|. |	.|. |	23	-0.028	0.005	107.96	0.000
.|. |	.|. |	24	0.023	0.041	108.31	0.000
.|. |	.|. |	25	-0.013	-0.020	108.43	0.000
.|. |	.|. |	26	0.016	0.018	108.60	0.000
.|. |	.|. |	27	-0.002	-0.021	108.61	0.000
.|. |	.|. |	28	-0.005	-0.001	108.62	0.000
.|. |	.|. |	29	-0.002	0.011	108.63	0.000
.|. |	.|. |	30	0.020	0.010	108.89	0.000
.|. |	*|. |	31	-0.054	-0.066	110.85	0.000
.|. |	.|. |	32	-0.030	0.009	111.46	0.000
.|. |	.|* |	33	0.058	0.089	113.79	0.000
.|* |	.|. |	34	0.084	0.035	118.62	0.000
.|. |	.|. |	35	0.060	0.007	121.06	0.000
.|. |	.|. |	36	0.021	-0.013	121.36	0.000

Correlogram of Monthly returns

Date: 07/07/08 Time: 15:43
Sample: 1995M07 2007M12
Included observations: 150

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
.|. |	.|. |	1	-0.038	-0.038	0.2200	0.639
.|. |	.|. |	2	0.001	-0.000	0.2204	0.896
*|. |	*|. |	3	-0.062	-0.062	0.8198	0.845
.|. |	.|. |	4	-0.024	-0.029	0.9085	0.923
.|* |	.|* |	5	0.077	0.075	1.8417	0.871
.|. |	.|. |	6	-0.012	-0.010	1.8650	0.932
*|. |	*|. |	7	-0.074	-0.079	2.7418	0.908
.|* |	.|* |	8	0.171	0.177	7.4190	0.492
.|* |	.|* |	9	0.077	0.095	8.3761	0.497
.|. |	.|. |	10	-0.028	-0.045	8.5034	0.580
.|. |	.|. |	11	-0.036	-0.019	8.7146	0.648
*|. |	.|. |	12	-0.064	-0.032	9.3817	0.670
.|* |	.|. |	13	0.083	0.053	10.540	0.649
.|. |	.|. |	14	0.050	0.037	10.958	0.689
**|. |	*|. |	15	-0.191	-0.178	17.115	0.312
.|. |	.|. |	16	-0.013	-0.038	17.143	0.376
.|* |	.|* |	17	0.079	0.080	18.224	0.375
.|. |	.|. |	18	-0.005	-0.036	18.228	0.441
.|. |	.|. |	19	0.038	0.020	18.483	0.490
**|. |	*|. |	20	-0.197	-0.139	25.269	0.191
.|. |	*|. |	21	-0.043	-0.071	25.593	0.222
.|* |	.|* |	22	0.145	0.113	29.336	0.136
*|. |	.|. |	23	-0.057	-0.014	29.927	0.151
.|* |	.|* |	24	0.069	0.089	30.777	0.160
.|. |	.|* |	25	0.059	0.092	31.406	0.176
.|. |	.|. |	26	0.025	0.016	31.525	0.209
.|* |	.|* |	27	0.120	0.084	34.185	0.161
*|. |	.|. |	28	-0.119	-0.031	36.843	0.122
.|. |	.|. |	29	-0.028	0.034	36.990	0.146
.|* |	.|* |	30	0.166	0.122	42.210	0.069
.|. |	.|. |	31	-0.001	-0.032	42.210	0.086
.|. |	.|. |	32	-0.010	-0.049	42.229	0.107
.|. |	.|* |	33	0.052	0.082	42.765	0.119
*|. |	*|. |	34	-0.091	-0.077	44.407	0.109
.|* |	.|. |	35	0.161	0.044	49.555	0.052
*|. |	*|. |	36	-0.095	-0.112	51.374	0.046

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