CHAPTER 6

EMPIRICAL STOCK RETURN AND VOLATILITY

We calculate the return by using the index of today minus the index of yesterday and then divided by the index of yesterday.

$$RETURN = \frac{INDEX_t - INDEX_{t-1}}{INDEX_{t-1}}$$

$RETURN$ = Return on stock index

$INDEX_t$ = Today stock index

$INDEX_{t-1}$ = Yesterday stock index

Now we looked for correlation between SET index and other sectors index under the normally distributed data.

Table 6

Correlation between SET index and other sectors index

	SET	BANK	FIN	COMMU	ENERGY	ELECTRO
SET	1.0000	0.9756	0.9882	0.9480	0.6932	-0.2296
BANK	0.9756	1.0000	0.9523	0.8750	0.7651	-0.3171
FIN	0.9882	0.9523	1.0000	0.9451	0.6435	-0.2103
COMMU	0.9480	0.875	0.9451	1.0000	0.4680	-0.0448
ENERGY	0.6932	0.7651	0.6435	0.4680	1.0000	-0.3323
ELECTRO	-0.2296	-0.3171	-0.2103	-0.0448	-0.3323	1.0000

We found that Financial sector had good correlation with SET index at 0.9882. The second rank was Banking sector index at 0.9756. The third rank was Communication sector index that had correlation at 0.9480. The forth was Energy sector that had moderate correlation of 0.6932. Electronic sector index, however, had negative correlation for –0.2296. We could see the result by picture at Figure 6-6.4. We concluded that all investors, local, institute, and foreign, who wanted to keep their trading pattern to be consistent with SET Index, they would invest in Financial sector, then follow by Banking sector, and

Communication Sector respectively. For Energy sector, all of investors put some of their invest into this sector as a result the correlation between SET index and Energy sector index was 0.6932. Electronic sector had negative correlation to SET index. This could be inferred that specific group of investors would invest into this sector. For running correlation process, we knew which sectors had correlation to SET index but it could not explain what types of investors had correlation to each sector. So we needed to use the OLS (Ordinary Least Square) and GARCH model to see the result.

After we found the correlation of each sector, we studied further by using Ordinary Least Squares (OLS). Then, we calculated the result of each sector.

Figure 6

Correlation between SET index and Banking sector index

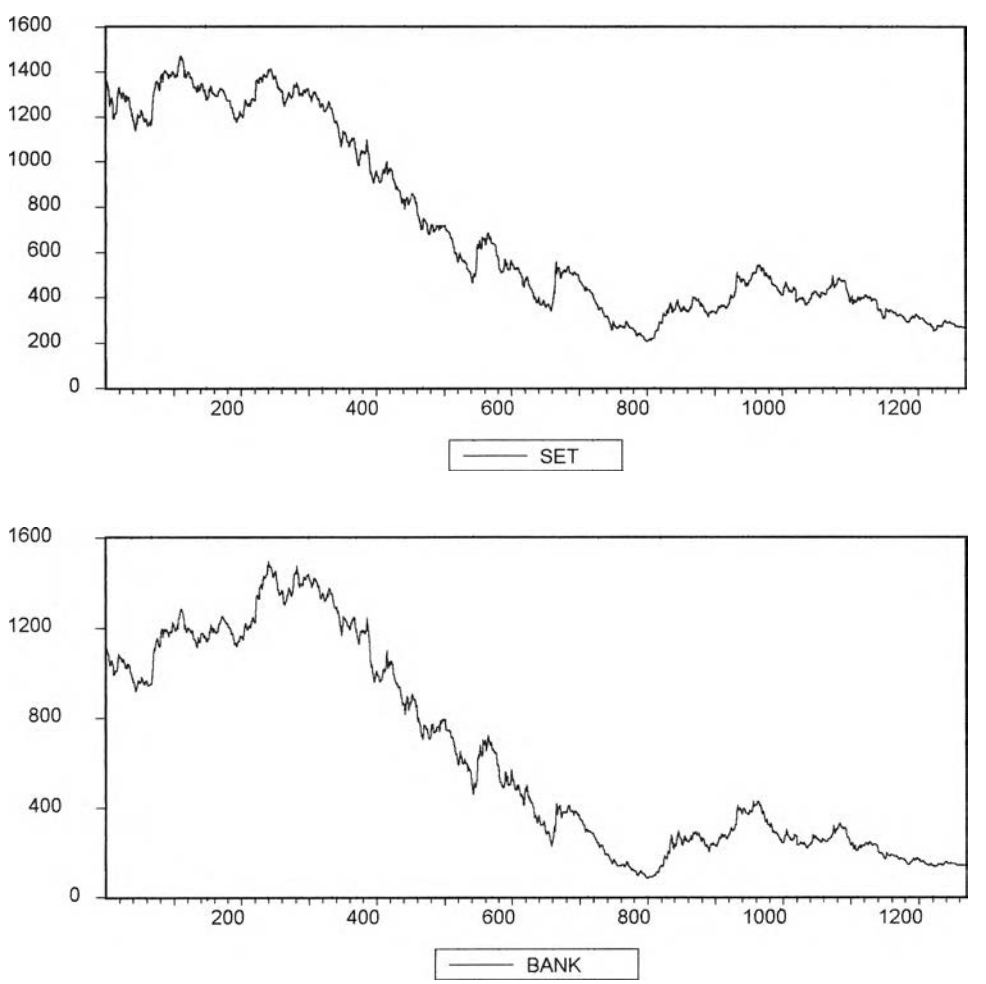


Table 6.1

Correlation matrix between SET index and Banking sector index

	SET	BANK
SET	1.0000	0.9756
BANK	0.9756	1.0000

Figure 6.1

Correlation between SET index and Financial sector index

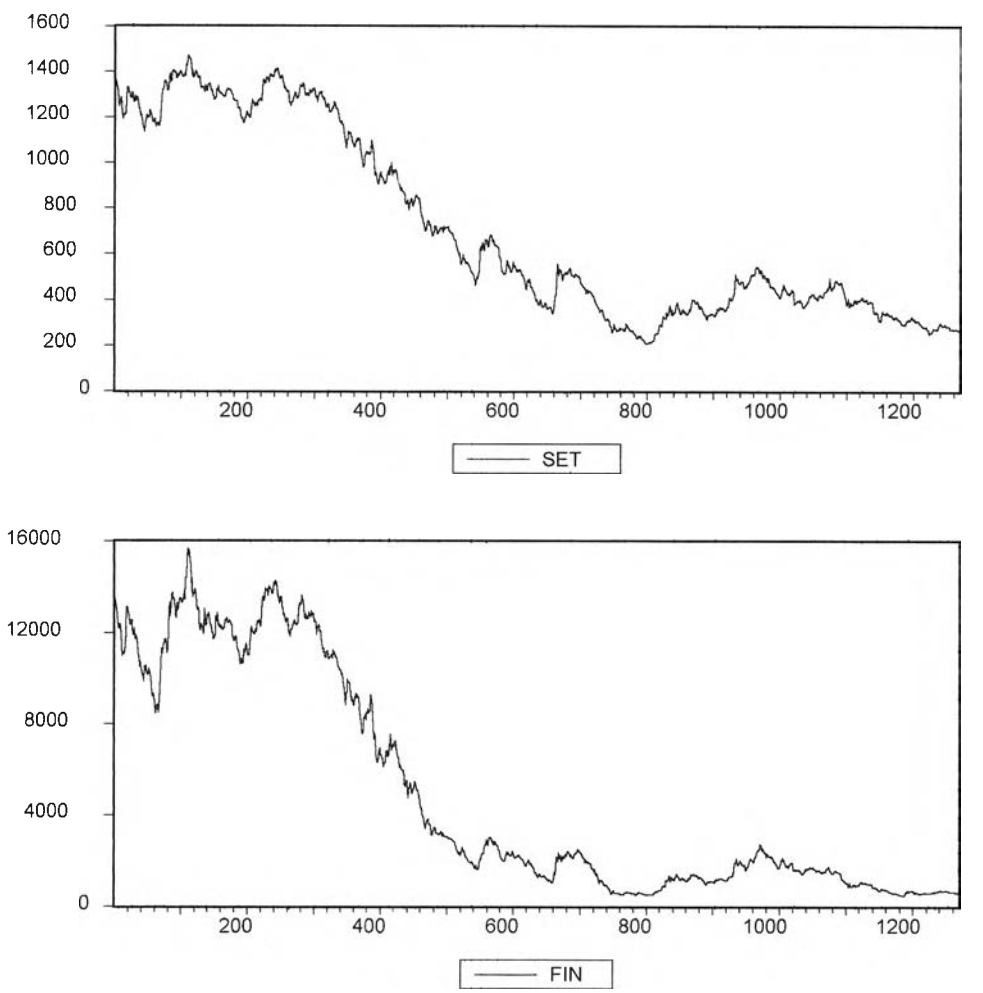


Table 6.2

Correlation matrix between SET index and Financial sector index

	SET	FIN
SET	1.0000	0.9882
FIN	0.9882	1.0000

Figure 6.2

Correlation between SET index and Communication sector index

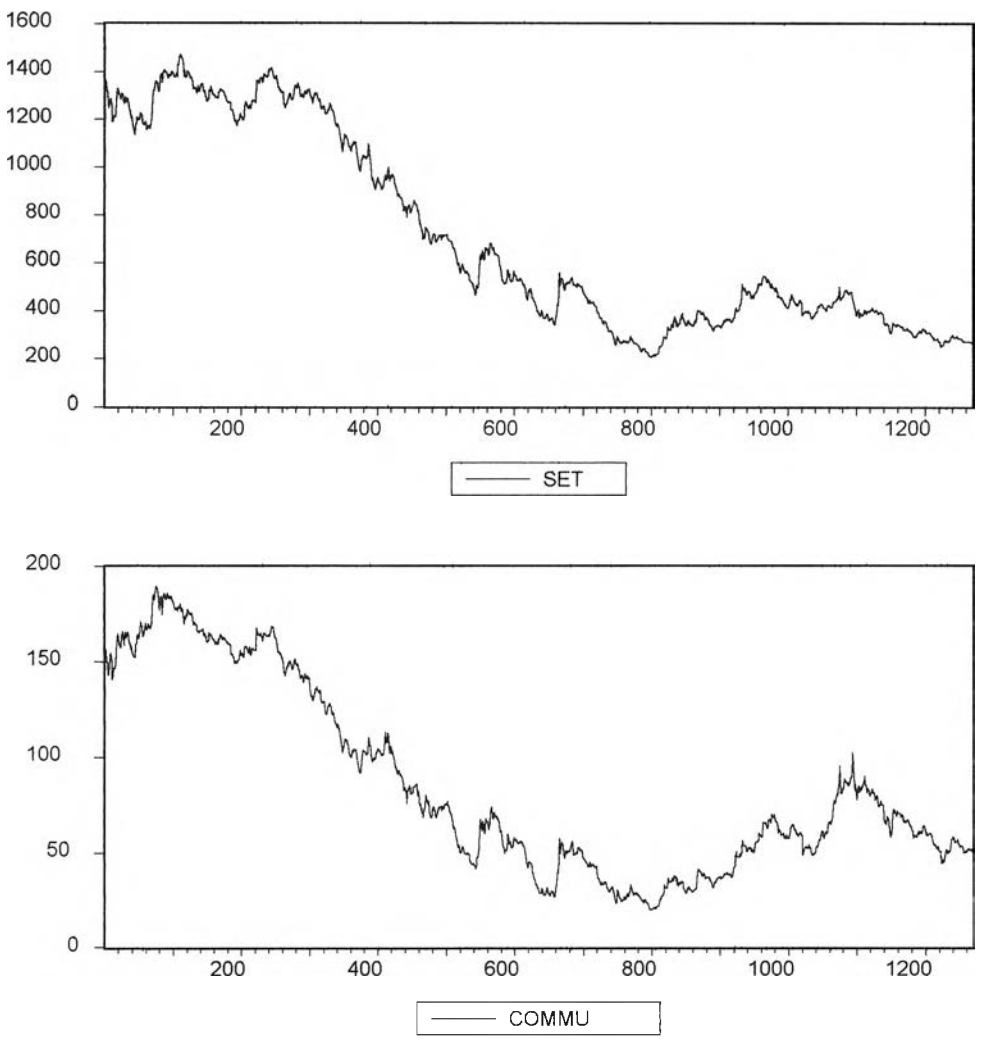


Table 6.3

Correlation matrix between SET index and Communication sector index

	SET	COMMU
SET	1.0000	0.9480
COMMU	0.9480	1.0000

Figure 6.3

Correlation between SET index and Energy sector index

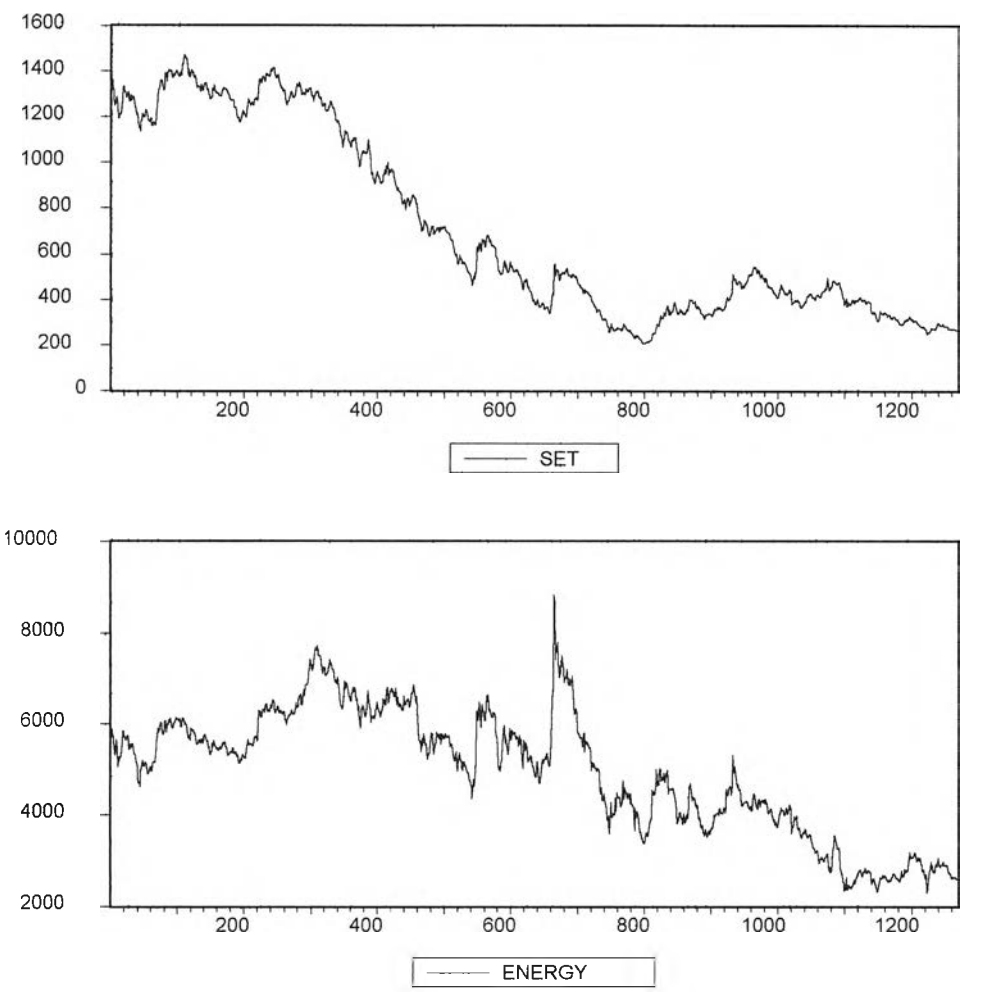


Table 6.4

Correlation matrix between SET index and Energy sector index

	SET	ENERGY
SET	1.0000	0.6932
ENERGY	0.6932	1.0000

Figure 6.4

Correlation between SET index and Electronic sector index

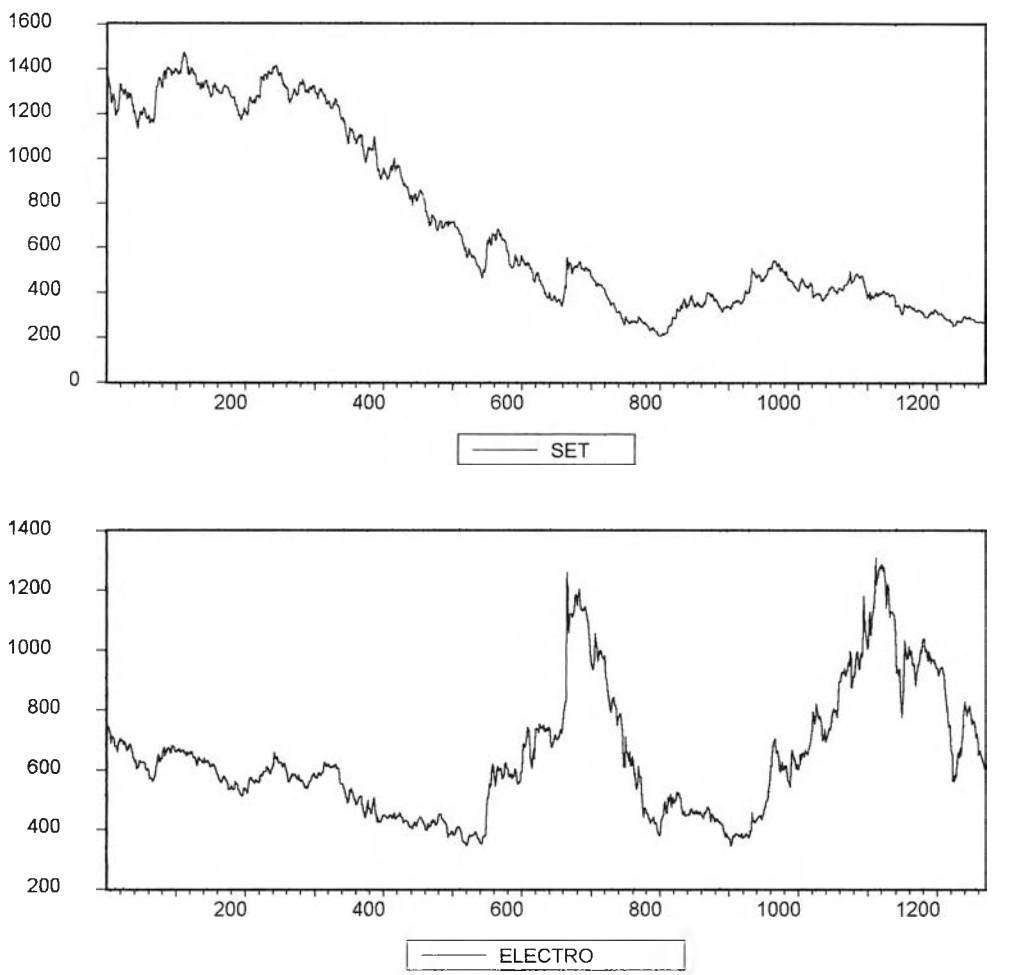


Table 6.5

Correlation matrix between SET index and Electronic sector index

	SET	ELECTRO
SET	1.0000	-0.2296
ELECTRO	-0.2296	1.0000

First let see the result of Return on SET index under OLS (t statistics are in parentheses):

$$RSET_t = \beta_1+\beta_2 RDJIA_{2t}+\beta_3 RIXIC_{3t}+\beta_4 RNIX_{4t}+\beta_5 RHK_{5t}+\beta_6 RCNET_{6t}+\beta_7 RINET_{7t}+ \beta_8 RFNET_{8t}+\beta_9 RVOL_{9t}+\beta_{10} RBAHT_{10t}+\varepsilon_t$$

$$RSET_t = -0.2308 + \underset{(3.3340)}{0.2057} RDJIA_{2t} - \underset{(-0.4229)}{0.0160} RIXIC_{3t} + \underset{(1.7016)}{0.0778} RNIX_{4t} + \underset{(12.5402)}{0.3805} RHK_{5t} + \underset{(0.8092)}{5.86} RCNET_{6t} - \underset{(-1.7555)}{4.03} RINET_{7t} + \underset{(1.5302)}{1.93} RFNET_{8t} + \underset{(9.7238)}{0.0118} RVOL_{9t} - \underset{(-3.0335)}{0.1957} RBAHT_{10t}+\varepsilon_t$$

$R^2 = 0.2576$ S = 2.0897 DW = 1.39221 Log likelihood = -2730.91

Note that the R^2 of this regression was low: stock return or the return on the stock index was very volatile. The coefficient of RCNET, that had effect to return on SET index, was 5.86. Then followed by RINET. For Hang Seng (RHK) had positive correlation to RSET and coefficient was 0.3805.

Next we re-estimated this OLS model by using the GARCH (1,1) for the error variance. The result of the study was:

$$RSET_t = -0.2500 + \underset{(5.3825)}{0.1688} RDJIA_{2t} - \underset{(-0.0627)}{0.0013} RIXIC_{3t} + \underset{(1.8208)}{0.0472} RNIX_{4t} + \underset{(19.4168)}{0.3600} RHK_{5t} - \underset{(-0.2719)}{1.92} RCNET_{6t} - \underset{(-0.3899)}{5.83} RINET_{7t} + \underset{(0.3825)}{1.69} RFNET_{8t} + \underset{(12.3840)}{0.0088} RVOL_{9t} - \underset{(-6.2246)}{0.2833} RBAHT_{10t}+\varepsilon_t$$

$$\sigma_t^2 = 0.0432 + 0.1307\varepsilon_{t-1}^2 + 0.8743\sigma_{t-1}^2$$
(13.0102) (83.1678)

$R^2 = 0.2492$ S = 2.1041 DW = 1.9108 Log likelihood = -2576.46

Using GARCH model, we saw that coefficients of RDJIA, RNIX and RHK index had positive coefficient correlation to RSET index at 0.1688, 0.0472, and 0.36 respectively. Those index that presented a positive correlation SET index; mean all three types of investors would refer DJIA, NIX and HK index as an indicator for trading in SET. While RCNET and RINET came with negative correlation, it could infer that local investors would rather sell their stock when the SET index begin moving up, or buying stock when the SET index begin moving down. Institution investors had negative coefficients correlation to SET index. Thus Institution investors would buy when SET index went down and sell when the SET index went up as a market supporter. This could be the policy or command from government. Only RFNET had positive coefficient correlation to RSET. Foreign investors would buy stocks when the SET index went up and, sell their stocks when SET index went down. Foreign investor kept tracking on the train with SET index. This was one reason why fund managers had to make their portfolio to be closely to SET index. For RVOL had a positive coefficients correlation to SET index since SET index could not go up if the volume of buying in stocks were not strong enough. On the hand other SET index could went down when the trading volume drained out. RBAHT was negative coefficient correlation to SET index. The reason was when the Baht was depreciated, stocks would be undervalued (for foreigner) and when Baht was strong, stock was overvalued.

According to GARCH (1,1), we saw that coefficients in regression equation had changed. The R^2 of regression had decreased, since the correcting for heteroscedasticity cause the R^2 to fall, and the standard error increased. The increase in the standard error, which could explain by the heteroscedastic error under OLS, was biased. Additional studying by GARCH that did not consider weather R^2 to be low or high, we considered only the variance of error term. The next step we discovered the equation of GARCH (1,1) that was

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-1}^2 + \sum_{j=1}^{q} \lambda_j \sigma_{t-1}^2$$

We saw variance (σ^2_t) of this GARCH (1,1). Then we studied standard deviation of GARCH (1,1) or the standard deviation of variance (σ^2_t). Since we could identify the variance (σ^2_t) of GARCH (1,1) then we could calculate standard deviation of GARCH (1,1) variance. The standard deviation of GARCH (1,1), the variance was 1.0087. The Maximum was 6.7046 while the minimum was –4.9932.

Figure 6.5

Residual RSET-GARCH

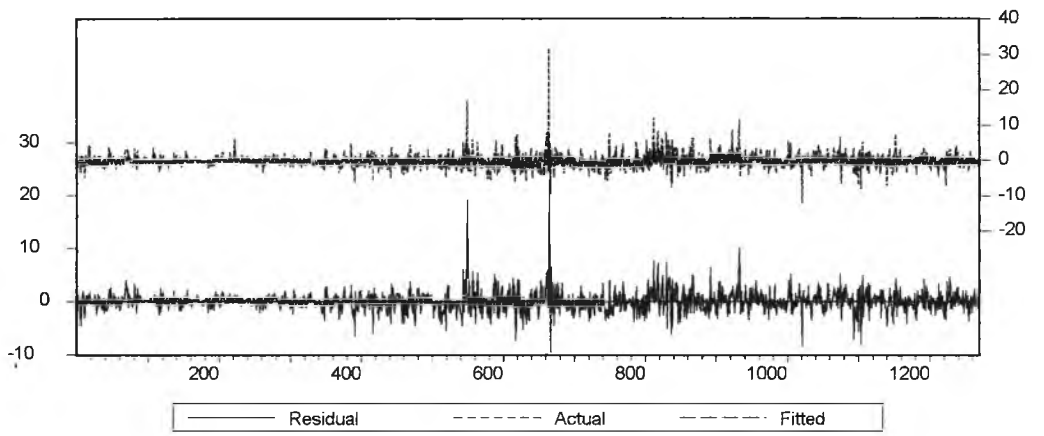
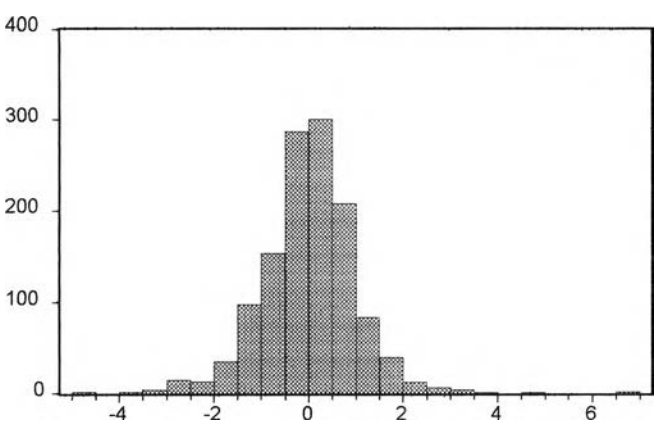


Figure 6.6

Standard deviation of Return on SET index



Series: Standardized Residuals	
Sample 1 1269	
Observations 1269	
Mean	0.003612
Median	0.037214
Maximum	6.704664
Minimum	-4.993253
Std. Dev.	1.008704
Skewness	0.178545
Kurtosis	7.418336
Jarque-Bera	1038.952
Probability	0.000000

Table 6.6

The results of Return on SET index after using OLS

LS // Dependent Variable is SET_RETURN

Sample: 1 1269

Included observations: 1269

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	0.205686	0.061692	3.334089	0.0009
IXIC_RETURN	-0.016009	0.037848	-0.422980	0.6724
NIX_RETURN	0.067784	0.039834	1.701685	0.0891
HK_RETURN	0.380512	0.030343	12.54025	0.0000
CNET_RETURN	5.86E-06	7.24E-06	0.809271	0.4185
INET_RETURN	-4.03E-05	2.29E-05	-1.755516	0.0794
FNET_RETURN	1.93E-06	1.26E-06	1.530260	0.1262
VOL_RETURN	0.011779	0.001211	9.723809	0.0000
BAHT_RETURN	-0.195741	0.064526	-3.033533	0.0025
C	-0.230766	0.059927	-3.850749	0.0001

R-squared	0.257697	Mean dependent var	-0.100865
Adjusted R-squared	0.252390	S.D. dependent var	2.416869
S.E. of regression	2.089732	Akaike info criterion	1.481920
Sum squared resid	5498.026	Schwarz criterion	1.522472
Log likelihood	-2730.911	F-statistic	48.56357
Durbin-Watson stat	1.922192	Prob(F-statistic)	0.000000

Table 6.7

The results of Return on SET index after using GARCH

ARCH // Dependent Variable is SET_RETURN

Sample: 1 1269

Included observations: 1269

Convergence achieved after 87 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	0.168860	0.031371	5.382592	0.0000
IXIC_RETURN	-0.001310	0.020883	-0.062738	0.9500
NIX_RETURN	0.047270	0.025960	1.820858	0.0689
HK_RETURN	0.360016	0.018541	19.41681	0.0000
CNET_RETURN	-1.92E-06	7.08E-06	-0.271903	0.7857
INET_RETURN	-5.83E-06	1.50E-05	-0.389944	0.6966
FNET_RETURN	1.69E-06	4.43E-06	0.382591	0.7021
VOL_RETURN	0.008816	0.000712	12.38408	0.0000
BAHT_RETURN	-0.283320	0.045516	-6.224610	0.0000
C	-0.250047	0.050687	-4.933112	0.0000

Variance Equation

C	0.043276	0.015579	2.777759	0.0056
ARCH(1)	0.130744	0.010049	13.01026	0.0000
GARCH(1)	0.874385	0.010513	83.16780	0.0000

R-squared	0.249217	Mean dependent var	-0.100865
Adjusted R-squared	0.242044	S.D. dependent var	2.416869
S.E. of regression	2.104142	Akaike info criterion	1.498007
Sum squared resid	5560.832	Schwarz criterion	1.550724
Log likelihood	-2576.469	F-statistic	34.74334
Durbin-Watson stat	1.910808	Prob(F-statistic)	0.000000

Second let see the result of Return on Banking index under OLS (t statistics are in parentheses):

$$RBANK_t = \beta_1+\beta_2 RDJIA_{2t}+\beta_3 RIXIC_{3t}+\beta_4 RNIX_{4t}+\beta_5 RHK_{5t}+\beta_6 RCNET_{6t}+\beta_7 RINET_{7t}+\beta_8 RFNET_{8t}+\beta_9 RVOL_{9t}+\beta_{10} RBAHT_{10t}+\varepsilon_t$$

$$RBANK_t = -0.2764 + \underset{(4.8215)}{0.4594} RDJIA_{2t} - \underset{(-1.8808)}{0.1099} RIXIC_{3t} + \underset{(1.9553)}{0.1201} RNIX_{4t} + \underset{(9.4491)}{0.4428} RHK_{5t} + \underset{(0.9866)}{1.10} RCNET_{6t} - \underset{(-2.5055)}{8.88} RINET_{7t} + \underset{(0.8379)}{1.63} RFNET_{8t} + \underset{(8.6111)}{0.0161} RVOL_{9t} - \underset{(-3.1261)}{0.3115} RBAHT_{10t} + \varepsilon_t$$

$R^2 = 0.2003$ S = 3.2278 DW = 2.0624 Log likelihood = -3282.65

From this result we saw RBANK had positive correlation to DJIA, RNIX, RHK, CNET, FNET, and RVOL. RIXIC, RINET and RBAHT, however, had negative correlation. Banking sector was one of sector that local investors were interested by showing of coefficients of 1.10 and foreign investors had higher coefficients at 1.63. Institution investors, on the contrary, had negative coefficients. Their R^2 was only 0.2003, which was, less than R^2 of RSET. Then the result on GARCH (1,1) was:

$$RBANK_t = -0.1895 + \underset{(4.9344)}{0.2422} RDJIA_{2t} - \underset{(-2.3439)}{0.0718} RIXIC_{3t} + \underset{(0.5282)}{0.0200} RNIX_{4t} + \underset{(14.8937)}{0.4300} RHK_{5t} + \underset{(0.3238)}{6.17} RCNET_{6t} + \underset{(0.0141)}{3.21} RINET_{7t} + \underset{(0.3920)}{1.55} RFNET_{8t} + \underset{(11.9956)}{0.0100} RVOL_{9t} - \underset{(-3.4133)}{0.3080} RBAHT_{10t} + \varepsilon_t$$

$$\sigma_t^2 = \underset{(10.8787)}{0.0160} + \underset{(159.1580)}{0.0801}\varepsilon_{t-1}^2 + 0.9272\sigma_{t-1}^2$$

$R^2 = 0.1814$ S = 3.2698 DW = 2.0375 Log likelihood = -3024.70

Table 6.8

The results of Return on Banking sector index after using OLS

LS // Dependent Variable is BANK_RETURN

Sample: 1 1269

Included observations: 1269

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	0.459451	0.095291	4.821540	0.0000
IXIC_RETURN	-0.109957	0.058462	-1.880826	0.0602
NIX_RETURN	0.120173	0.061528	1.953130	0.0510
HK_RETURN	0.442876	0.046869	9.449179	0.0000
CNET_RETURN	1.10E-05	1.12E-05	0.986657	0.3240
INET_RETURN	-8.88E-05	3.54E-05	-2.505577	0.0124
FNET_RETURN	1.63E-06	1.95E-06	0.837940	0.4022
VOL_RETURN	0.016112	0.001871	8.611167	0.0000
BAHT_RETURN	-0.311577	0.099669	-3.126125	0.0018
C	-0.276435	0.092566	-2.986350	0.0029

R-squared	0.200350	Mean dependent var	-0.101333
Adjusted R-squared	0.194634	S.D. dependent var	3.596834
S.E. of regression	3.227877	Akaike info criterion	2.351498
Sum squared resid	13117.76	Schwarz criterion	2.392050
Log likelihood	-3282.659	F-statistic	35.04884
Durbin-Watson stat	2.062453	Prob(F-statistic)	0.000000

Table 6.9

The results of Return on Banking sector index after using GARCH

ARCH // Dependent Variable is BANK_RETURN

Sample: 1 1269

Included observations: 1269

Convergence achieved after 38 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	0.242266	0.049097	4.934423	0.0000
IXIC_RETURN	-0.071842	0.030650	-2.343932	0.0192
NIX_RETURN	0.020049	0.037955	0.528237	0.5974
HK_RETURN	0.430034	0.028874	14.89366	0.0000
CNET_RETURN	6.17E-06	1.91E-05	0.323806	0.7461
INET_RETURN	3.21E-07	2.28E-05	0.014055	0.9888
FNET_RETURN	1.55E-06	1.67E-06	0.932011	0.3515
VOL_RETURN	0.010011	0.000835	11.99559	0.0000
BAHT_RETURN	-0.307979	0.090229	-3.413288	0.0007
C	-0.189505	0.065025	-2.914349	0.0036

Variance Equation

C	0.015992	0.009025	1.772021	0.0766
ARCH(1)	0.080144	0.007367	10.87873	0.0000
GARCH(1)	0.927247	0.005826	159.1580	0.0000

R-squared	0.181394	Mean dependent var	-0.101333
Adjusted R-squared	0.173573	S.D. dependent var	3.596834
S.E. of regression	3.269811	Akaike info criterion	2.379656
Sum squared resid	13428.73	Schwarz criterion	2.432373
Log likelihood	-3024.691	F-statistic	23.19295
Durbin-Watson stat	2.037491	Prob(F-statistic)	0.000000

After using GARCH (1,1) for reducing the error term, we got more variables that coefficient statistically significant such as RIXIC. R^2 decreased to 0.1814. GARCH model, however, did not concern about R^2. DJIA, NIX and HK were positive correlation to Banking sector index as investors continued to invest in Banking sector if the DJIA, NIX and HK market went up.

RIXIC index had negative correlation to Banking sector index as IXIC index calculated only technology stocks. The coefficients of RCNET, RINET and RFNET turned positive. These means all type of investors as local, institution and foreign investors preferred to invest in Banking sector. Local investors, institution investors and foreign investors expressed their interest respectively. RBAHT was still negative and standard error was not change significantly. RVOL was still positive coefficients correlation.

Figure 6.7

Residual RBANK-GARCH

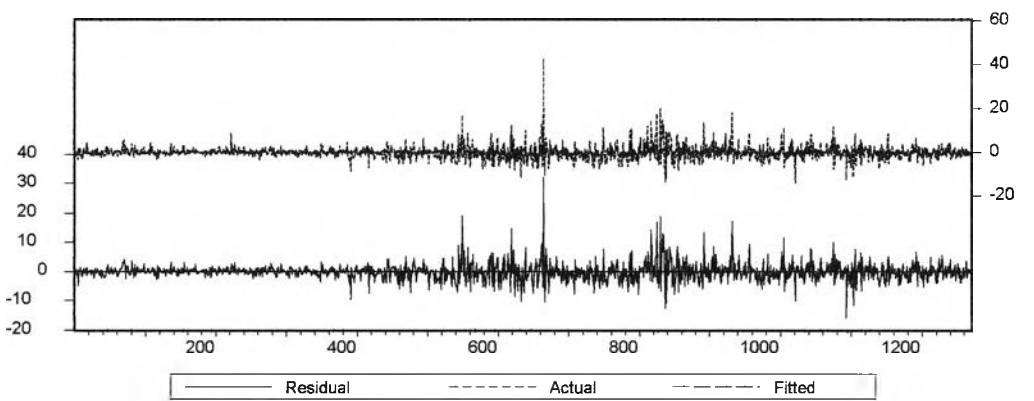
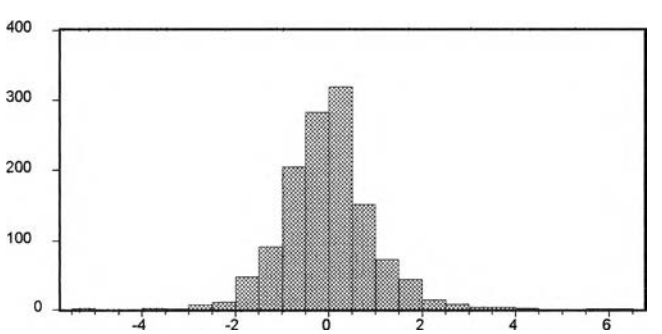


Figure 6.8

Standard deviation of Return on Banking sector index



Series: Standardized Residuals	
Sample 1 1269	
Observations 1269	
Mean	-0.020974
Median	-0.021869
Maximum	6.287930
Minimum	-5.428781
Std. Dev.	1.001798
Skewness	0.384562
Kurtosis	7.383885
Jarque-Bera	1047.454
Probability	0.000000

Standard deviation of RBANK in GARCH (1,1) is 1.002. Maximum was 6.2879 and minimum was –5.4288.

For the result of Return on Financial index under OLS (t statistics are in parentheses)

$$RFIN_t = \beta_1+\beta_2 RDJIA_{2t}+\beta_3 RIXIC_{3t}+\beta_4 RNIX_{4t}+\beta_5 RHK_{5t}+\beta_6 RCNET_{6t}+\beta_7 RINET_{7t}+ \beta_8 RFNET_{8t}+\beta_9 RVOL_{9t}+\beta_{10} RBAHT_{10t}+\varepsilon_t$$

$$RFIN_t = -0.3815 + 0.4122RDJIA_{2t} - 0.0859RIXIC_{3t} + 0.0804RNIX_{4t} + 0.5196RHK_{5t}$$
(3.4484) (-1.1712) (1.0415) (8.8363)

$$+ 1.68RCNET_{6t} - 9.34RINET_{7t} + 3.28RFNET_{8t} + 0.0206RVOL_{9t}$$
(1.1978) (-2.1016) (1.3423) (8.7992)

$$- 0.1077RBAHT_{10t}+\varepsilon_t$$
(-0.8613)

$R^2 = 0.1675$ S = 4.0497 DW = 2.0567 Log likelihood = -3570.50

For running OLS we found that RIXIC, RINET and RBAHT had negative number while RINET had higher coefficients than others. This could infer that institution investors focused to this sector than other sectors. Finally, financial sector was not correlated to Nasdaq index.

Return on Financial sector under the GARCH (1,1) technical:

$$RFIN_t = - 0.4172 + 0.3661RDJIA_{2t} - 0.1420RIXIC_{3t} + 0.0727RNIX_{4t} + 0.3846RHK_{5t}$$
(6.0040) (-3.6621) (1.3840) (11.0077)

$$+ 1.27RCNET_{6t} - 3.02RINET_{7t} + 3.04RFNET_{8t} + 0.0152RVOL_{9t}$$
(0.4743) (-1.0185) (0.3307) (10.0453)

$$- 0.0727RBAHT_{10t}+\varepsilon_t$$
(-0.7665)

$$\sigma_t^2 = 0.3532 + 0.1171\varepsilon_{t-1}^2 + 0.8722\sigma_{t-1}^2$$
(14.9517) (86.1842)

R^2 = 0.1535 S = 4.0882 DW = 2.0248 Log likelihood = -3414.54

Figure 6.9

Residual RFIN-GARCH

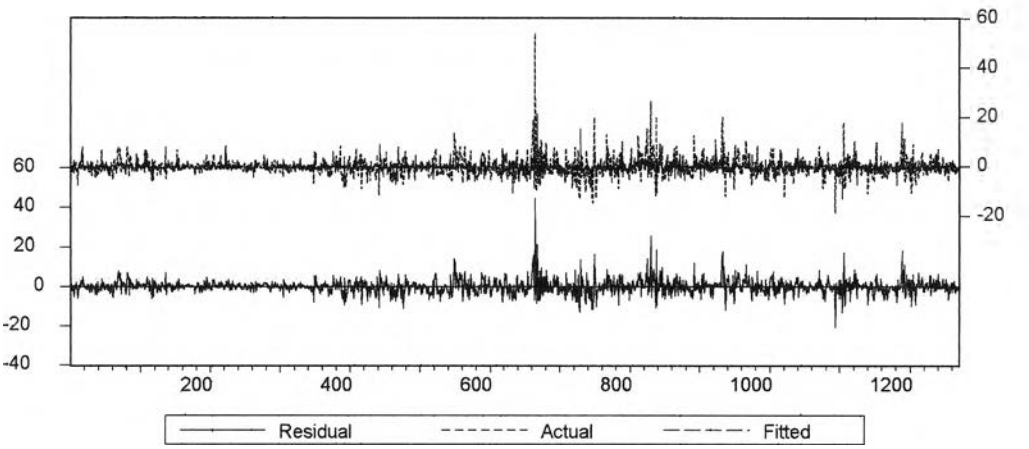
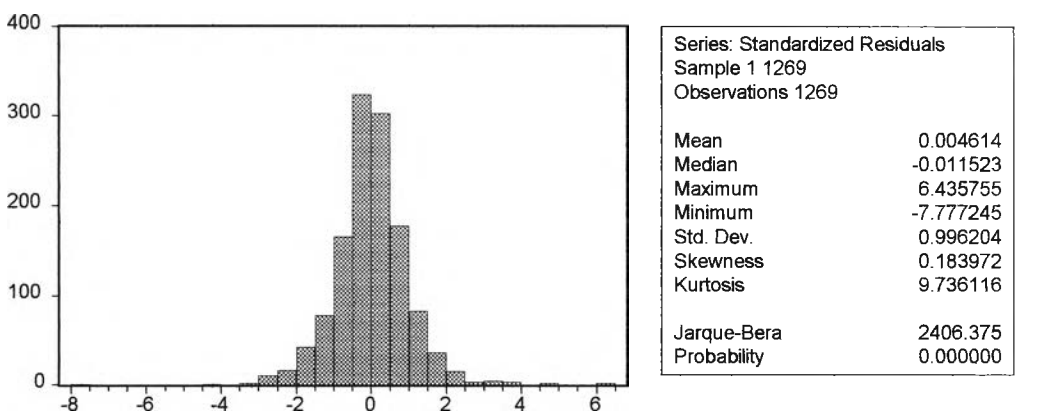


Figure 6.10

Standard deviation of Financial sector index



For RINET and RFNET had higher coefficient than CNET. RINET and RFNET had coefficient of 3.02 and 3.04, while CNET had coefficient at 1.27. We concluded that foreign investor's and institution investors' volume had higher correlation to financial sector than local investors do. On the contrary, local investors and foreign investors had positive correlation while institution investors had negative correlation to financial sector index. RINET had negative coefficient correlation to RFIN due to institution investors

Table 6.10 RFIN-OLS

The results of Return on Financial sector index after using OLS

LS // Dependent Variable is FIN_RETURN

Sample: 1 1269

Included observations: 1269

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	0.412271	0.119554	3.448415	0.0006
IXIC_RETURN	-0.085904	0.073347	-1.171196	0.2417
NIX_RETURN	0.080405	0.077194	1.041591	0.2978
HK_RETURN	0.519600	0.058803	8.836306	0.0000
CNET_RETURN	1.68E-05	1.40E-05	1.197757	0.2312
INET_RETURN	-9.34E-05	4.45E-05	-2.101623	0.0358
FNET_RETURN	3.28E-06	2.44E-06	1.342329	0.1797
VOL_RETURN	0.020656	0.002348	8.799214	0.0000
BAHT_RETURN	-0.107698	0.125046	-0.861265	0.3893
C	-0.381578	0.116135	-3.285643	0.0010

R-squared	0.167450	Mean dependent var	-0.154750
Adjusted R-squared	0.161498	S.D. dependent var	4.422573
S.E. of regression	4.049739	Akaike info criterion	2.805154
Sum squared resid	20648.08	Schwarz criterion	2.845705
Log likelihood	-3570.503	F-statistic	28.13564
Durbin-Watson stat	2.056748	Prob(F-statistic)	0.000000

Table 6.11 RFIN-GARCH

The results of Return on Financial sector index after using GRACH

ARCH // Dependent Variable is FIN_RETURN

Included observations: 1269

Convergence achieved after 100 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	0.366167	0.060986	6.004097	0.0000
IXIC_RETURN	-0.142096	0.038801	-3.662193	0.0003
NIX_RETURN	0.072741	0.052557	1.384031	0.1666
HK_RETURN	0.384685	0.034947	11.00775	0.0000
CNET_RETURN	1.27E-05	2.68E-05	0.474375	0.6353
INET_RETURN	-3.02E-05	2.97E-05	-1.018518	0.3086
FNET_RETURN	3.04E-06	9.18E-06	0.330715	0.7409
VOL_RETURN	0.015229	0.001516	10.04538	0.0000
BAHT_RETURN	-0.072740	0.094891	-0.766560	0.4435
C	-0.417253	0.114921	-3.630785	0.0003

Variance Equation

C	0.353265	0.068789	5.135475	0.0000
ARCH(1)	0.117129	0.007834	14.95174	0.0000
GARCH(1)	0.872257	0.010121	86.18425	0.0000

R-squared	0.153560	Mean dependent var	-0.154750
Adjusted R-squared	0.145473	S.D. dependent var	4.422573
S.E. of regression	4.088254	Akaike info criterion	2.826427
Sum squared resid	20992.56	Schwarz criterion	2.879144
Log likelihood	-3414.536	F-statistic	18.98850
Durbin-Watson stat	2.024828	Prob(F-statistic)	0.000000

could come be a market maker. Foreign investors paid higher attention to invest in financial sector stocks. R^2 was very low and Baht also had negative coefficients.

Standard deviation for GARCH on return on financial sector was 0.9962, while maximum and minimum were 6.4357 and –7.7772 respectively.

The result of Return on Communication index under OLS (t statistics are in parentheses) were

$$RCOM_t = \beta_1+\beta_2 RDJIA_{2t}+\beta_3 RIXIC_{3t}+\beta_4 RNIX_{4t}+\beta_5 RHK_{5t}+\beta_6 RCNET_{6t}+\beta_7 RINET_{7t}+ \beta_8 RFNET_{8t}+\beta_9 RVOL_{9t}+\beta_{10} RBAHT_{10t}+\varepsilon_t$$

$$RCOM_t = -0.1846 + 0.0786 RDJIA_{2t} + 0.1034 RIXIC_{3t} + 0.0931 RNIX_{4t} + 0.5572 RHK_{5t}$$
$$(0.8715) \quad (1.8677) \quad (1.5981) \quad (12.5543)$$

$$+ 3.15 RCNET_{6t} - 3.94 RINET_{7t} + 2.11 RFNET_{8t} + 0.0134 RVOL_{9t}$$
$$(0.2970) \quad (-1.1743) \quad (1.1467) \quad (7.5524)$$
$$- 0.3010 RBAHT_{10t} + \varepsilon_t$$
$$(-3.1894)$$

$R^2 = 0.2339$ S = 3.0570 DW = 1.9262 Log likelihood = -3213.60

Most of them had positive correlation except RINET and RBAHT. R^2 was 0.2339 and standard error was 3.0570. Thailand communication sector index related with Nasdaq index than it did with Dow Jone Industry Average. Local investors and foreign investors were interested in this industry. Trading volume (or liquidity) also supported. Thai Baht, however, had negative correlation since Thailand had borrowed heavily in foreign exchange currency. Foreign investors had more knowledge about this industry as they had experienced from their countries.

For reducing the error term let see GARCH result:

$$RCOM_t = - 0.2996 - 0.0300 RDJIA_{2t} + 0.1861 RIXIC_{3t} + 0.1323 RNIX_{4t} + 0.3694 RHK_{5t}$$
$$(-0.5318) \quad (4.9159) \quad (3.3111) \quad (14.9403)$$

$$+ 6.68RCNET_{6t} - 1.83RINET_{7t} + 2.08RFNET_{8t} + 0.0117RVOL_{9t}$$
$$(0.3854) \qquad (-0.7195) \qquad (0.3092) \qquad (11.9211)$$
$$- 0.3750RBAHT_{10t} + \varepsilon_t$$
$$(-7.0737)$$

$$\sigma_t^2 = 4.1952 + 0.3850\varepsilon_{t-1}^2 + 0.1872\sigma_{t-1}^2$$
$$(10.3521) \qquad (7.2581)$$

$R^2 = 0.2177$ $S = 3.0926$ $DW = 1.8956$ Log likelihood = -3102.29

After running GARCH (1,1), RIXIC and RNIX had significant coefficients. Both were 4.9159 and 3.3111. R^2 dropped from 0.2339 to 0.2177 as a result of error term has reduced. RIXIC, RNIX and RHK came to positive coefficients, as Nasdaq index was a communication and technology stock index that worked as a leading indicator index for other stock in communication and technology sectors in other market. Stocks in Japan and Hong Kong had higher weighted in communication and technology stocks (New economy). So all types of investors used Nasdaq index as an indicator for trading in communication stocks. Local investors and foreign investors were interest in this sector; the number of positive coefficient was as 6.68 for RCNET and 2.08 for RFNET. We concluded that investors bought communication stock when these index moving up and sell when these index declined. While institution investors has a negative coefficient of 1.83, presented that institution investors would buy communication stocks when the price of communication stock went down and sell when stocks went up.

Standard deviation was 0.9986 while Maximum and minimum were 9.0395 and –5.6989 respectively.

Figure 6.11

Standard deviation of Communication sector index

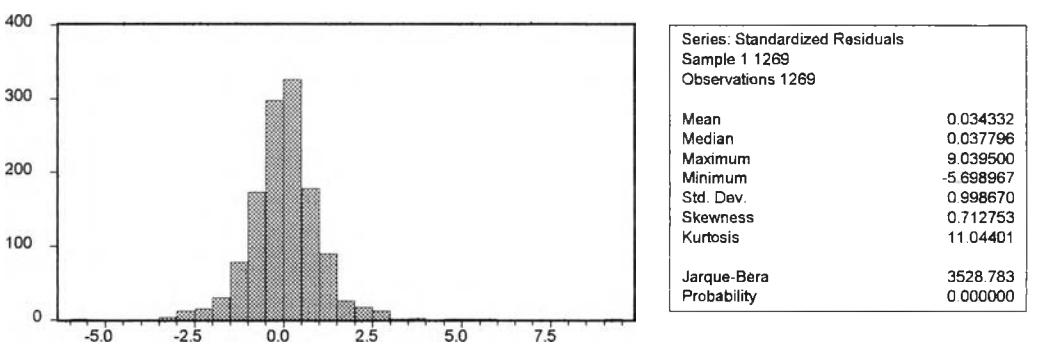
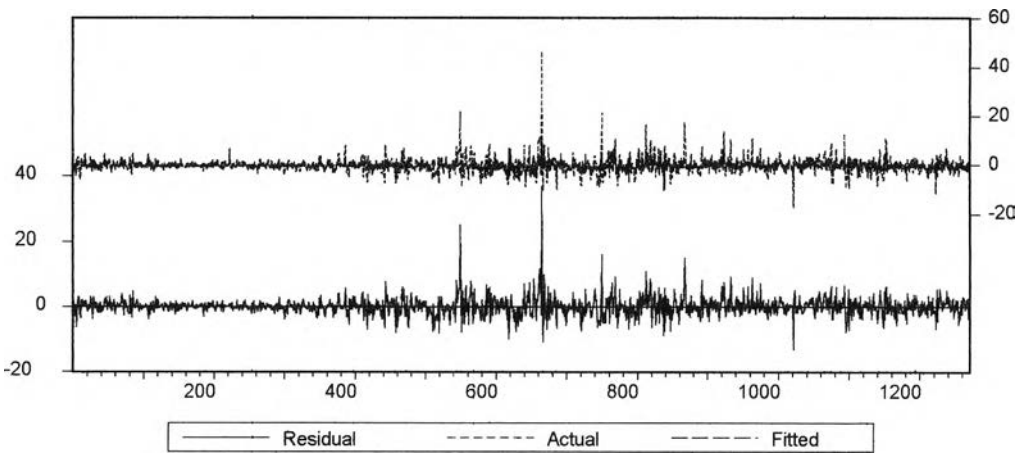


Figure 6.12

Residual RCOM-GARCH



Studying of result of Return Energy on index under OLS (t statistics are in parentheses)

$$RENER_t = \beta_1+\beta_2 RDJIA_{2t}+\beta_3 RIXIC_{3t}+\beta_4 RNIX_{4t}+\beta_5 RHK_{5t}+\beta_6 RCNET_{6t}+\beta_7 RINET_{7t}+ \beta_8 RFNET_{8t}+\beta_9 RVOL_{9t}+\beta_{10} RBAHT_{10t}+\varepsilon_t$$

$$RENER_t = -0.1619 + \underset{(2.5400)}{0.2013} RDJIA_{2t} - \underset{(-0.5568)}{0.0270} RIXIC_{3t} + \underset{(1.1987)}{0.0613} RNIX_{4t} + \underset{(10.0012)}{0.3900} RHK_{5t} + \underset{(0.2188)}{2.04} RCNET_{6t} - \underset{(-0.3749)}{1.11} RINET_{7t} + \underset{(1.8130)}{2.93} RFNET_{8t} + \underset{(7.7391)}{0.0120} RVOL_{9t} - \underset{(-0.6365)}{0.1619} RBAHT_{10t} + \varepsilon_t$$

$R^2 = 0.1690$ S = 2.6855 DW = 2.0602 Log likelihood = -3049.26

This sector was one of the other sectors that foreign investors were interested. We found that the coefficients was significant (at 2.93) and also had positive correlation with energy sector. However, we found that foreign exchange rate moved reverse relationship with energy sector. The coefficient was 0.1619. When Thai Baht was weak, the price of import crude oil would jump and push up the energy price. Foreign investors invested in this sector for medium term or long-term investment. Let see what may change under the GARCH (1,1)

Table 6.12 RCOM-OLS

The results of Return on Communication sector index after using OLS

LS // Dependent Variable is COMMU_RETURN

Sample: 1 1269

Included observations: 1269

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	0.078653	0.090244	0.871554	0.3836
IXIC_RETURN	0.103405	0.055366	1.867671	0.0620
NIX_RETURN	0.093125	0.058270	1.598168	0.1103
HK_RETURN	0.557247	0.044387	12.55431	0.0000
CNET_RETURN	3.15E-06	1.06E-05	0.297003	0.7665
INET_RETURN	-3.94E-05	3.36E-05	-1.174315	0.2405
FNET_RETURN	2.11E-06	1.84E-06	1.146747	0.2517
VOL_RETURN	0.013383	0.001772	7.552455	0.0000
BAHT_RETURN	-0.301055	0.094390	-3.189476	0.0015
C	-0.184668	0.087664	-2.106549	0.0354

R-squared	0.233873	Mean dependent var	-0.032040
Adjusted R-squared	0.228397	S.D. dependent var	3.480059
S.E. of regression	3.056917	Akaike info criterion	2.242663
Sum squared resid	11765.03	Schwarz criterion	2.283214
Log likelihood	-3213.603	F-statistic	42.70351
Durbin-Watson stat	1.926241	Prob(F-statistic)	0.000000

Table 6.13 RCOM-GARCH

The results of Return on Communication sector index after using GARCH

ARCH // Dependent Variable is COMMU_RETURN

Sample: 1 1269

Included observations: 1269

Convergence achieved after 100 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	-0.030041	0.056481	-0.531888	0.5949
IXIC_RETURN	0.186115	0.037860	4.915925	0.0000
NIX_RETURN	0.132359	0.039974	3.311102	0.0010
HK_RETURN	0.369458	0.024729	14.94033	0.0000
CNET_RETURN	6.68E-06	1.73E-05	0.385485	0.6999
INET_RETURN	-1.83E-05	2.54E-05	-0.719579	0.4719
FNET_RETURN	2.08E-06	6.74E-06	0.309280	0.7572
VOL_RETURN	0.011691	0.000981	11.92112	0.0000
BAHT_RETURN	-0.375080	0.053024	-7.073753	0.0000
C	-0.299561	0.083116	-3.604136	0.0003

Variance Equation

C	4.195280	0.212113	19.77851	0.0000
ARCH(1)	0.385069	0.037197	10.35214	0.0000
GARCH(1)	0.187293	0.025805	7.258117	0.0000

R-squared	0.217738	Mean dependent var	-0.032040
Adjusted R-squared	0.210265	S.D. dependent var	3.480059
S.E. of regression	3.092626	Akaike info criterion	2.268233
Sum squared resid	12012.81	Schwarz criterion	2.320950
Log likelihood	-3102.292	F-statistic	29.13343
Durbin-Watson stat	1.895612	Prob(F-statistic)	0.000000

$$RENER_t = - 0.1959 + 0.2491RDJIA_{2t} - 0.0925RIXIC_{3t} + 0.0562RNIX_{4t} + 0.3506RHK_{5t}$$
$$(4.9499) \quad (-3.0696) \quad (1.6153) \quad (14.5754)$$
$$- 5.11RCNET_{6t} - 7.60RINET_{7t} + 2.87RFNET_{8t} + 0.0102RVOL_{9t}$$
$$(-0.6497) \quad (-0.4867) \quad (0.9870) \quad (11.7466)$$
$$- 0.0838RBAHT_{10t} + \varepsilon_t$$
$$(-1.2872)$$

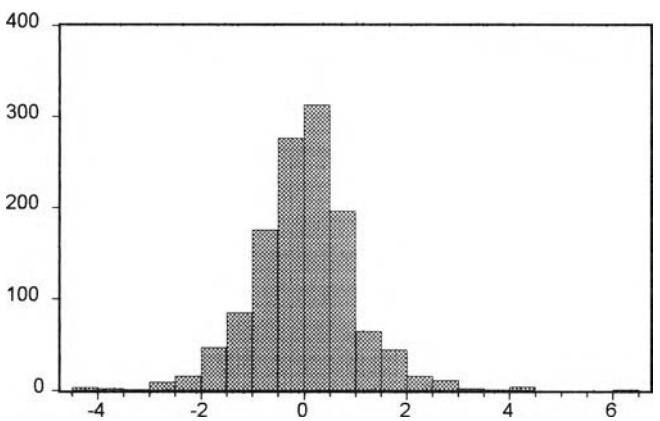
$$\sigma_t^2 = 0.3816 + 0.2124\varepsilon_{t-1}^2 + 0.7528\sigma_{t-1}^2$$
$$(11.1877) \quad (35.9824)$$

$R^2 = 0.2177$ S = 3.0926 DW = 1.8956 Log likelihood = -3102.29

A coefficient of RFNET was not change significantly, but RCNET and RINET had high negative coefficients (-5.11 points and –7.6 points) after applying GARCH model. These results presented local and institution investors did not pay more attention in this Energy stock. Foreign investors, however, still invested in this Energy sector stock. Nasdaq index had low negative correlation with energy sector as a reason difference type of stocks. R^2 and standard error were increased slightly. Standard deviation was 1.0059. The maximum was 6.02928 and the minimum was –4.24435.

Figure 6.13

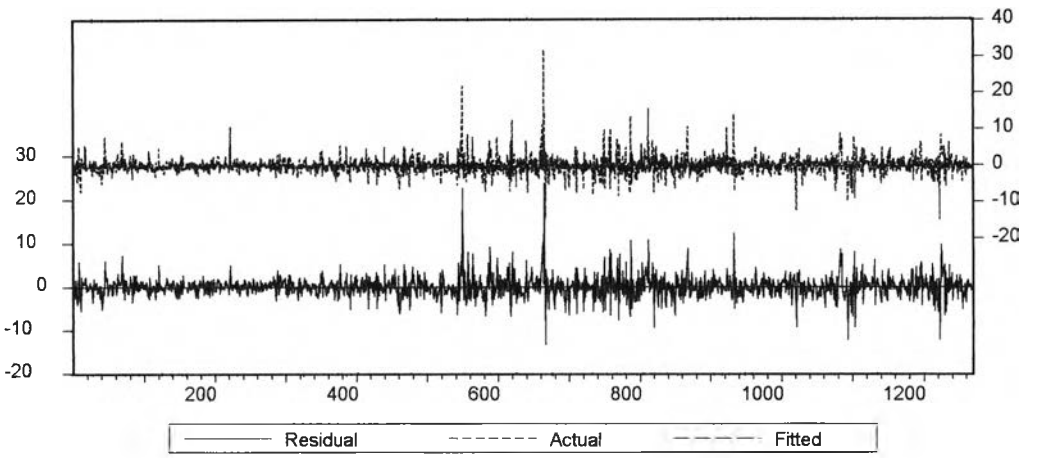
Standard deviation of Return on Energy sector index



Series: Standardized Residuals	
Sample 1 1269	
Observations 1269	
Mean	0.004986
Median	0.036275
Maximum	6.029286
Minimum	-4.243588
Std. Dev.	1.005990
Skewness	0.197730
Kurtosis	5.818489
Jarque-Bera	428.3017
Probability	0.000000

Figure 6.14

Residual RENERGY-GARCH



The less but not last was the result of Return Electronic on index under OLS (t statistics were in parentheses):

$$RELEC_t = \beta_1+\beta_2 RDJIA_{2t}+\beta_3 RIXIC_{3t}+\beta_4 RNIX_{4t}+\beta_5 RHK_{5t}+\beta_6 RCNET_{6t}+\beta_7 RINET_{7t}+ \beta_8 RFNET_{8t}+\beta_9 RVOL_{9t}+\beta_{10} RBAHT_{10t}+\varepsilon_t$$

$$RELEC_t = \underset{}{-0.0803} \underset{(-0.7857)}{-0.0660 RDJIA_{2t}} + \underset{(3.7019)}{0.1910 RIXIC_{3t}} \underset{(-0.6606)}{-0.0358 RNIX_{4t}} + \underset{(11.4680)}{0.4743 RHK_{5t}} + \underset{(0.9875)}{9.75 RCNET_{6t}} \underset{(-1.0252)}{-3.21 RINET_{7t}} + \underset{(1.3245)}{2.27 RFNET_{8t}} + \underset{(4.4978)}{0.0074 RVOL_{9t}} \underset{(-0.5687)}{-0.0500 RBAHT_{10t}} + \varepsilon_t$$

$R^2 = 0.1660$ S = 2.8487 DW = 1.8562 Log likelihood = -3124.12

Local investors, institution investors and foreign investors were interest in this sector. The numbers of coefficients were 9.75, 3.21 and 2.27 but RINET had negative coefficients. NASDAQ came with the leading sign to electronic sector as positive number of 0.1910. And RBAHT was negative correlation to electronic industry because of most of electronic products were exported. The result would change by applying GARCH (1,1)

Table 6.14

The results of Return on Energy sector index after using OLS

LS // Dependent Variable is ENERGY_RETURN

Sample: 1 1269

Included observations: 1269

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	0.201381	0.079282	2.540039	0.0112
IXIC_RETURN	-0.027087	0.048640	-0.556874	0.5777
NIX_RETURN	0.061367	0.051192	1.198773	0.2308
HK_RETURN	0.390003	0.038995	10.00127	0.0000
CNET_RETURN	2.04E-06	9.31E-06	0.218806	0.8268
INET_RETURN	-1.11E-05	2.95E-05	-0.374962	0.7078
FNET_RETURN	2.93E-06	1.62E-06	1.813086	0.0701
VOL_RETURN	0.012048	0.001557	7.739181	0.0000
BAHT_RETURN	-0.052789	0.082925	-0.636594	0.5245
C	-0.161988	0.077015	-2.103320	0.0356

R-squared	0.169036	Mean dependent var	-0.024692
Adjusted R-squared	0.163096	S.D. dependent var	2.935641
S.E. of regression	2.685597	Akaike info criterion	1.983655
Sum squared resid	9080.449	Schwarz criterion	2.024206
Log likelihood	-3049.262	F-statistic	28.45641
Durbin-Watson stat	2.060233	Prob(F-statistic)	0.000000

Table 6.15

The results of Return on Energy sector index after using GARCH

ARCH // Dependent Variable is ENERGY_RETURN

Sample: 1 1269

Included observations: 1269

Convergence achieved after 27 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	0.249142	0.050332	4.949958	0.0000
IXIC_RETURN	-0.092594	0.030165	-3.069595	0.0022
NIX_RETURN	0.056232	0.034812	1.615328	0.1065
HK_RETURN	0.350692	0.024061	14.57542	0.0000
CNET_RETURN	-5.11E-06	7.87E-06	-0.649718	0.5160
INET_RETURN	-7.60E-06	1.56E-05	-0.486721	0.6265
FNET_RETURN	2.87E-06	2.91E-06	0.987052	0.3238
VOL_RETURN	0.010250	0.000873	11.74667	0.0000
BAHT_RETURN	-0.083896	0.065173	-1.287274	0.1982
C	-0.195912	0.062868	-3.116228	0.0019

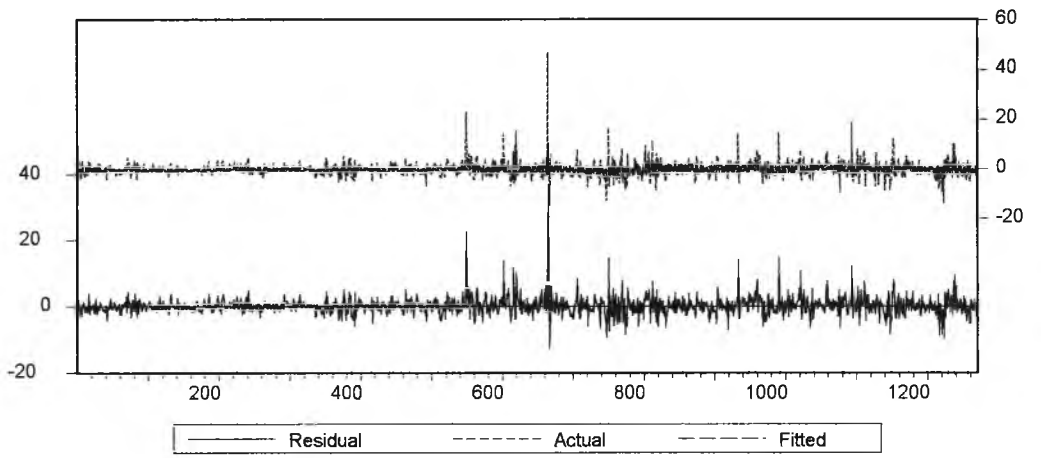
Variance Equation

C	0.381637	0.070440	5.417890	0.0000
ARCH(1)	0.212404	0.018985	11.18775	0.0000
GARCH(1)	0.752883	0.020924	35.98245	0.0000

R-squared	0.164406	Mean dependent var	-0.024692
Adjusted R-squared	0.156423	S.D. dependent var	2.935641
S.E. of regression	2.696283	Akaike info criterion	1.993939
Sum squared resid	9131.044	Schwarz criterion	2.046656
Log likelihood	-2901.747	F-statistic	20.59351
Durbin-Watson stat	2.053358	Prob(F-statistic)	0.000000

Figure 6.15

Residual RELEC-GRACH



$$RELEC_t = \underset{(0.7514)}{- 0.2624} + \underset{(3.8818)}{0.0328RDJIA_{2t}} + \underset{(-3.0860)}{0.1530RIXIC_{3t}} - \underset{(19.6757)}{0.1168RNIX_{4t}} + 0.5192RHK_{5t}$$

$$+ \underset{(0.2287)}{4.41RCNET_{6t}} - \underset{(-0.5851)}{3.27RINET_{7t}} + \underset{(0.1742)}{1.84RFNET_{8t}} + \underset{(2.4674)}{0.0040RVOL_{9t}}$$

$$+ \underset{(1.5029)}{0.0994RBAHT_{10t}} + \varepsilon_t$$

$$\sigma_t^2 = \underset{(7.3342)}{0.4163} + \underset{(35.8128)}{0.1743\varepsilon^2_{t-1}} + 0.8166\sigma^2_{t-1}$$

$R^2 = 0.1545$ S = 2.8719 DW = 1.8509 Log likelihood = -3041.28

GARCH (1,1) indicated the result of RDJIA turned from -0.0660 to 0.0328 and RIXIC was still positive coefficient due mainly to investors used Nasdaq index to decide when they would buy and sell electronic stock. Baht, however, had low positive coefficients. The coefficient of RCNET and RFNET also were positive (at 4.41 points and 1.84 points), meaning both local and institution investors would invest in this sector. But local investors had more correlates buying and selling of electronic stock than foreign investors. For RINET had higher negative coefficient in electronic stocks. It meant that institution investors would not focus for this sector as electronic sector had negative correlation to SET index. So institution investors did not work as market makers to support this sector.

Table 6.16

The results of Return on Electronic sector index after using OLS

LS // Dependent Variable is ELECTRO_RETURN

Sample: 1 1269

Included observations: 1269

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	-0.066078	0.084100	-0.785707	0.4322
IXIC_RETURN	0.191006	0.051596	3.701956	0.0002
NIX_RETURN	-0.035877	0.054302	-0.660682	0.5089
HK_RETURN	0.474373	0.041365	11.46804	0.0000
CNET_RETURN	9.75E-06	9.87E-06	0.987574	0.3236
INET_RETURN	-3.21E-05	3.13E-05	-1.025286	0.3054
FNET_RETURN	2.27E-06	1.72E-06	1.324470	0.1856
VOL_RETURN	0.007428	0.001651	4.497867	0.0000
BAHT_RETURN	-0.050026	0.087963	-0.568708	0.5697
C	-0.080318	0.081695	-0.983149	0.3257

R-squared	0.166032	Mean dependent var	0.029108
Adjusted R-squared	0.160070	S.D. dependent var	3.108408
S.E. of regression	2.848783	Akaike info criterion	2.101633
Sum squared resid	10217.50	Schwarz criterion	2.142184
Log likelihood	-3124.119	F-statistic	27.85005
Durbin-Watson stat	1.856284	Prob(F-statistic)	0.000000

Table 6.17

The results of Return on Electronic sector index after using GARCH

ARCH // Dependent Variable is ELECTRO_RETURN

Sample: 1 1269

Included observations: 1269

Convergence achieved after 100 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DJIA_RETURN	0.032770	0.043612	0.751391	0.4526
IXIC_RETURN	0.153050	0.039427	3.881816	0.0001
NIX_RETURN	-0.116804	0.037849	-3.086056	0.0021
HK_RETURN	0.519233	0.026389	19.67578	0.0000
CNET_RETURN	4.41E-06	1.93E-05	0.228697	0.8191
INET_RETURN	-3.27E-05	5.59E-05	-0.585137	0.5586
FNET_RETURN	1.84E-06	1.06E-05	0.174259	0.8617
VOL_RETURN	0.004010	0.001625	2.467418	0.0137
BAHT_RETURN	0.099432	0.066159	1.502922	0.1331
C	-0.262418	0.077150	-3.401412	0.0007

Variance Equation

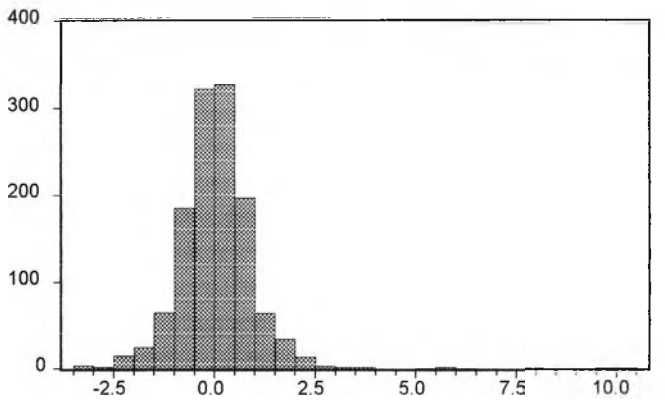
C	0.416345	0.094128	4.423177	0.0000
ARCH(1)	0.174272	0.023761	7.334220	0.0000
GARCH(1)	0.816635	0.022803	35.81286	0.0000

R-squared	0.154460	Mean dependent var	0.029108
Adjusted R-squared	0.146381	S.D. dependent var	3.108408
S.E. of regression	2.871904	Akaike info criterion	2.120142
Sum squared resid	10359.28	Schwarz criterion	2.172859
Log likelihood	-3041.279	F-statistic	19.12005
Durbin-Watson stat	1.850984	Prob(F-statistic)	0.000000

Standard deviation for GARCH (1,1) on electronic sector index was 0.9848. Mean was 0.0595. Maximum was 10.2081 and minimum was –3.2982.

Figure 6.16

Standard deviation of Electronic sector index



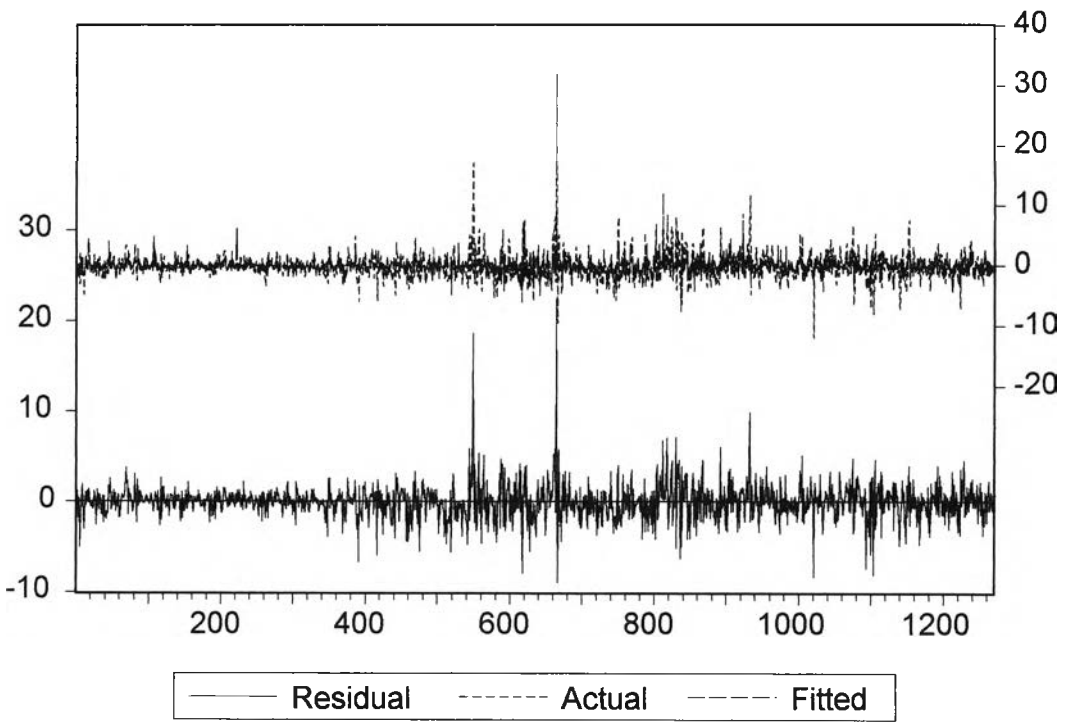
Series: Standardized Residuals	
Sample 1 1269	
Observations 1269	
Mean	0.059516
Median	0.024091
Maximum	10.20816
Minimum	-3.298284
Std. Dev.	0.984873
Skewness	2.229025
Kurtosis	23.13933
Jarque-Bera	22496.56
Probability	0.000000

So we could conclude that GARCH model was more accurate since GARCH reduced the error term of OLS equation. We saw the result from the graph of residual between using OLS and GARCH. The residual of equation reduced significantly after using GARCH, such GARCH was the econometric technical tool that could minimize error for all variables from the equation(s). It helps minimize the error term from "Heteroskedasticity". For additional explanation, we studied the graph of residual on OLS and compared it with the graph of residual on GARCH model (Figure 6.17-6.22).

Figure 6.17

Residual return on SET index of OLS and GRACH

OLS



GARCH

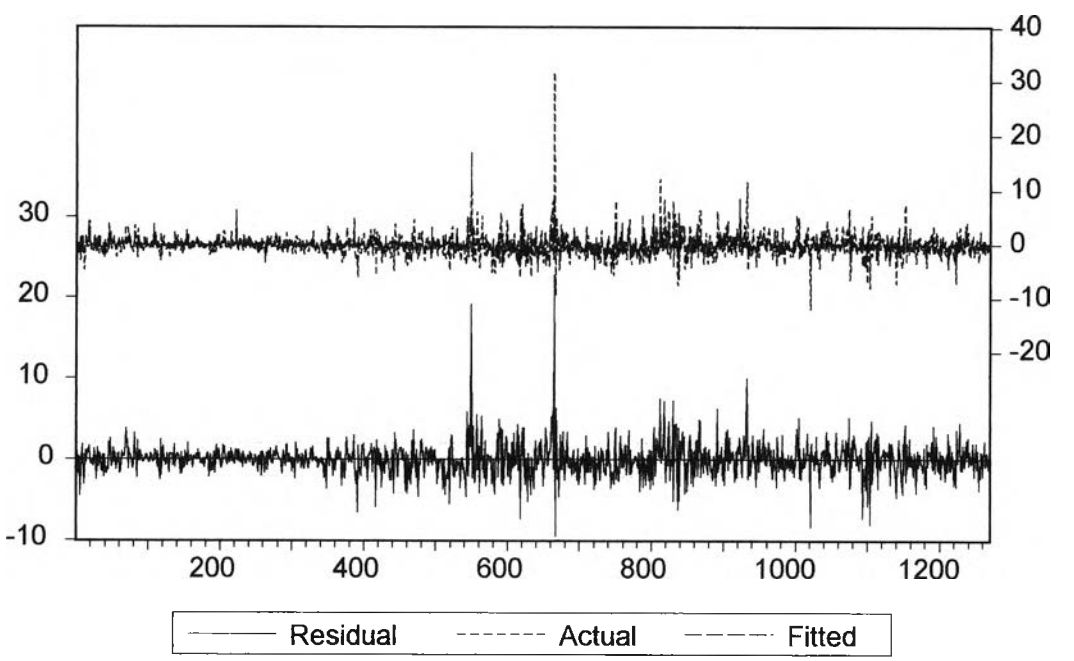
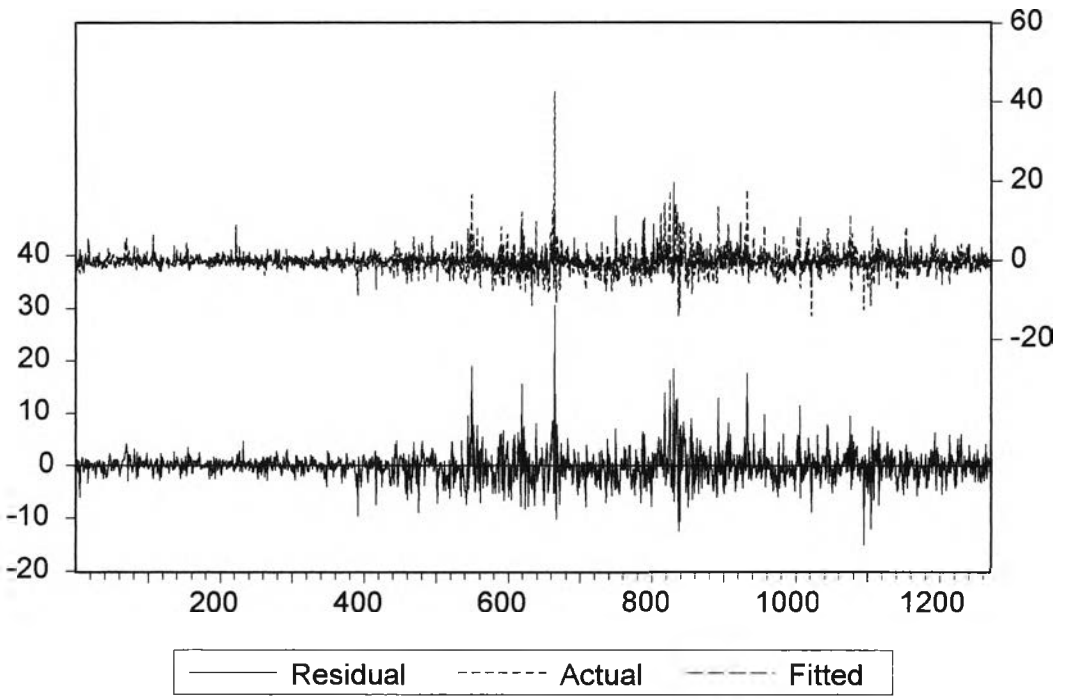


Figure 6.18

Residual return on BANKING sector index of OLS and GRACH

OLS



GARCH

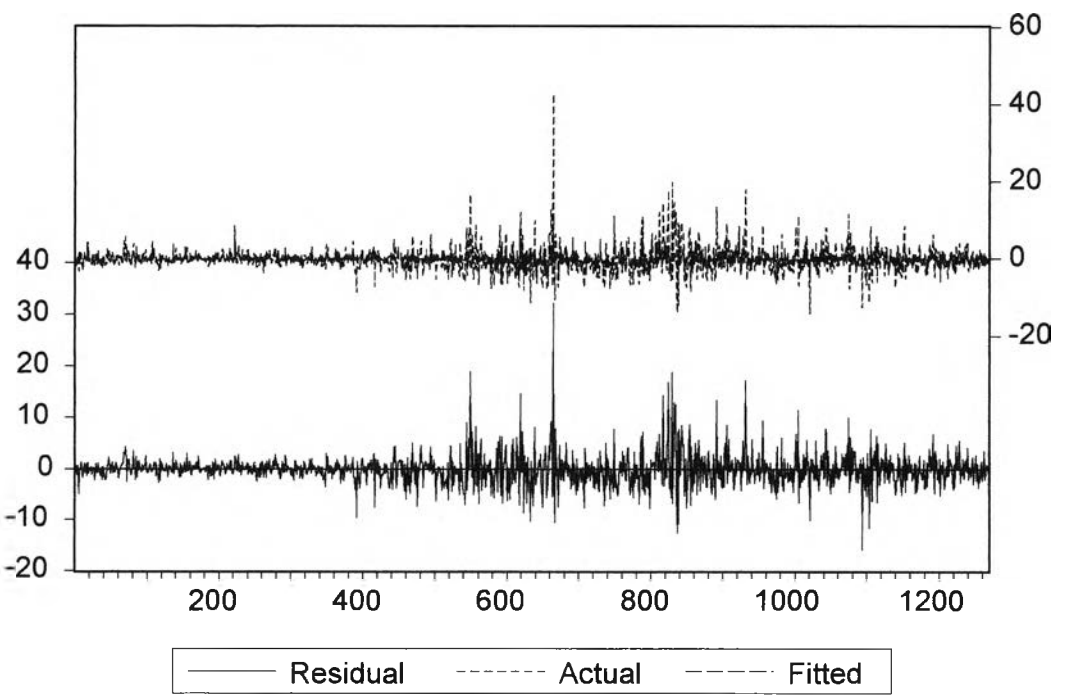
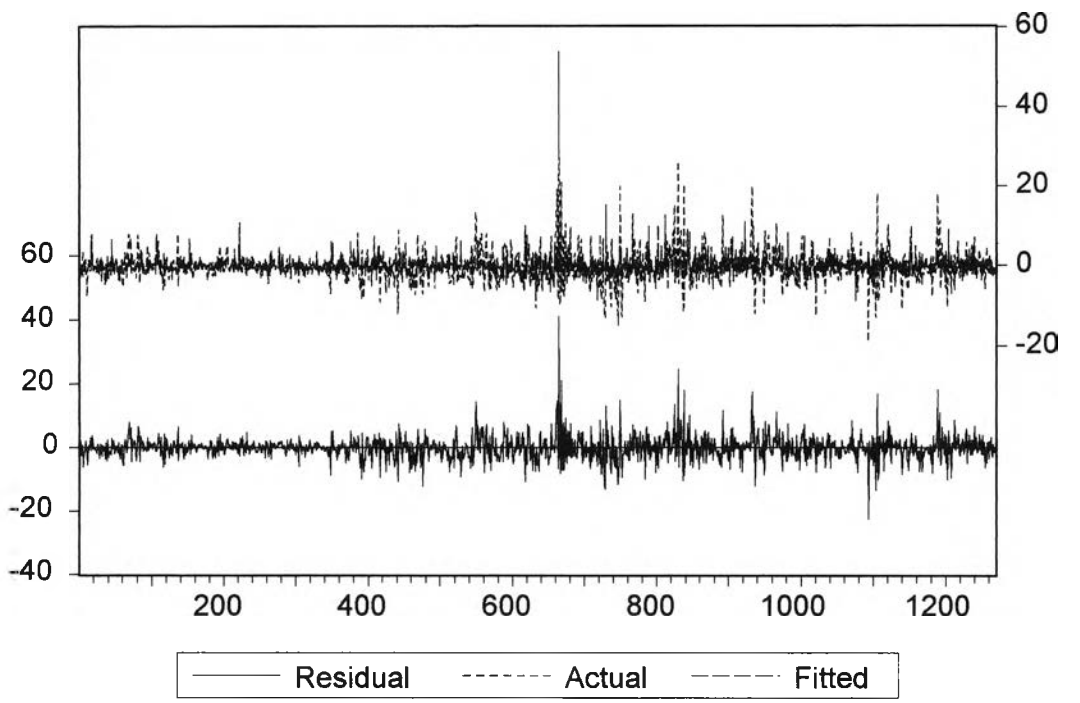


Figure 6.19

Residual return on FINANCIAL sector index of OLS and GRACH

OLS



GARCH

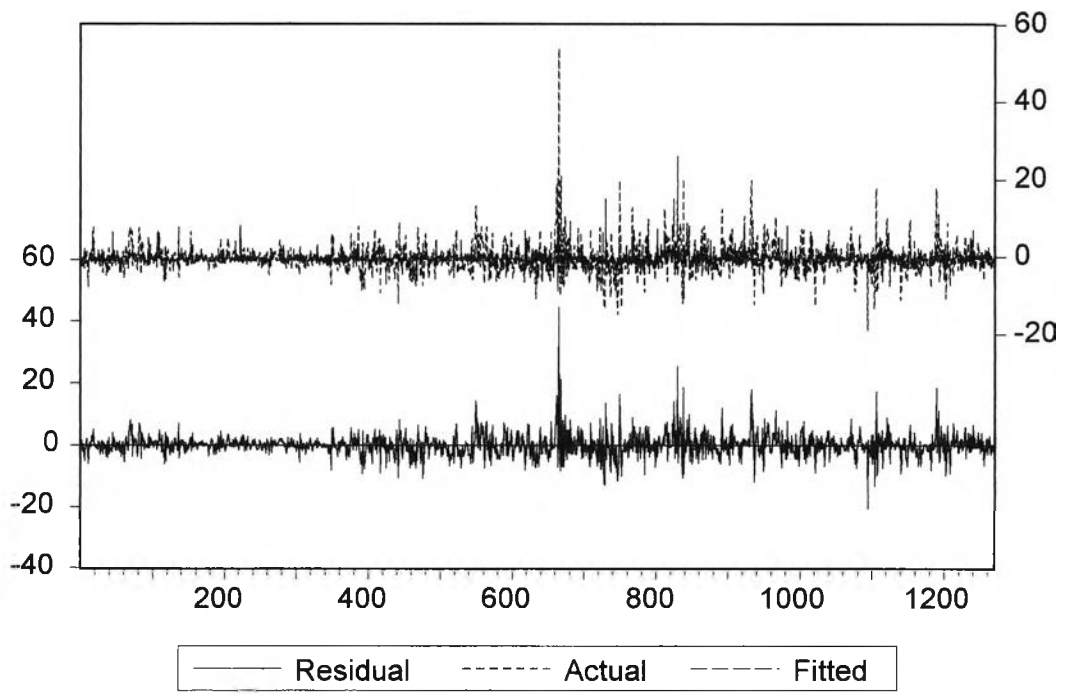
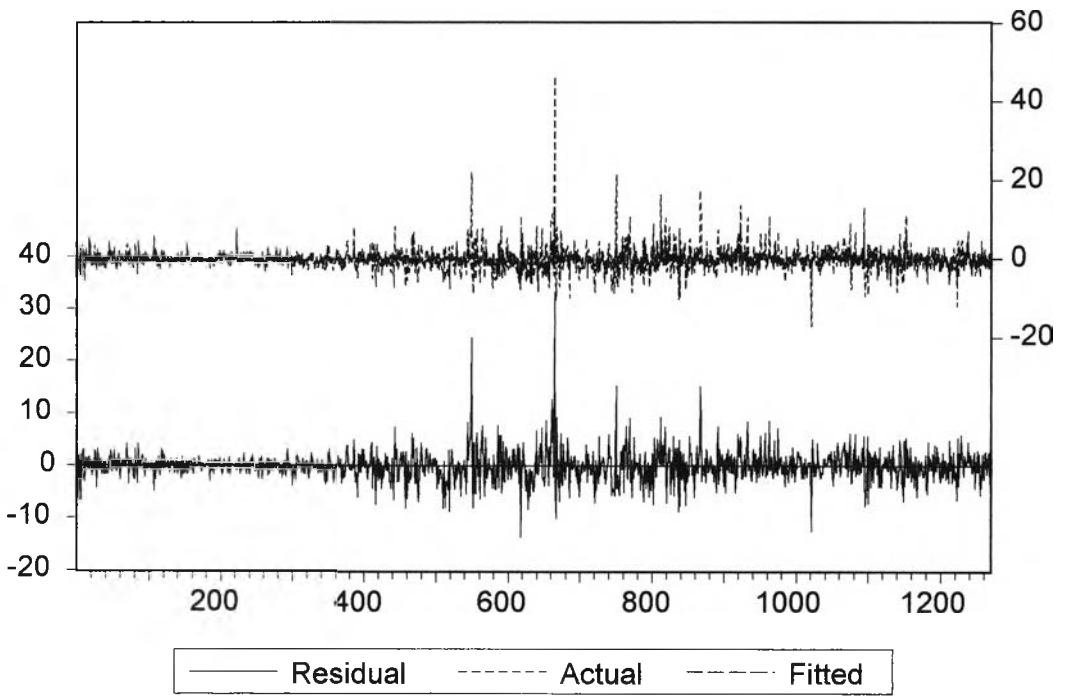


Figure 6.20

Residual return on COMMUNICATION sector index of OLS and GRACH

OLS



GARCH

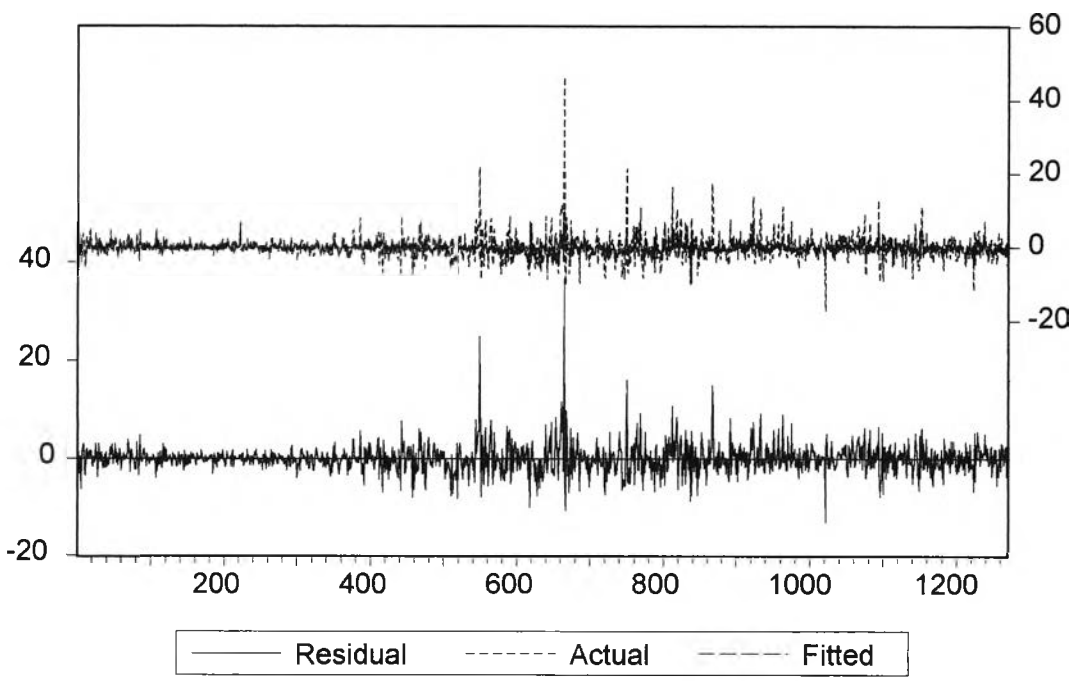
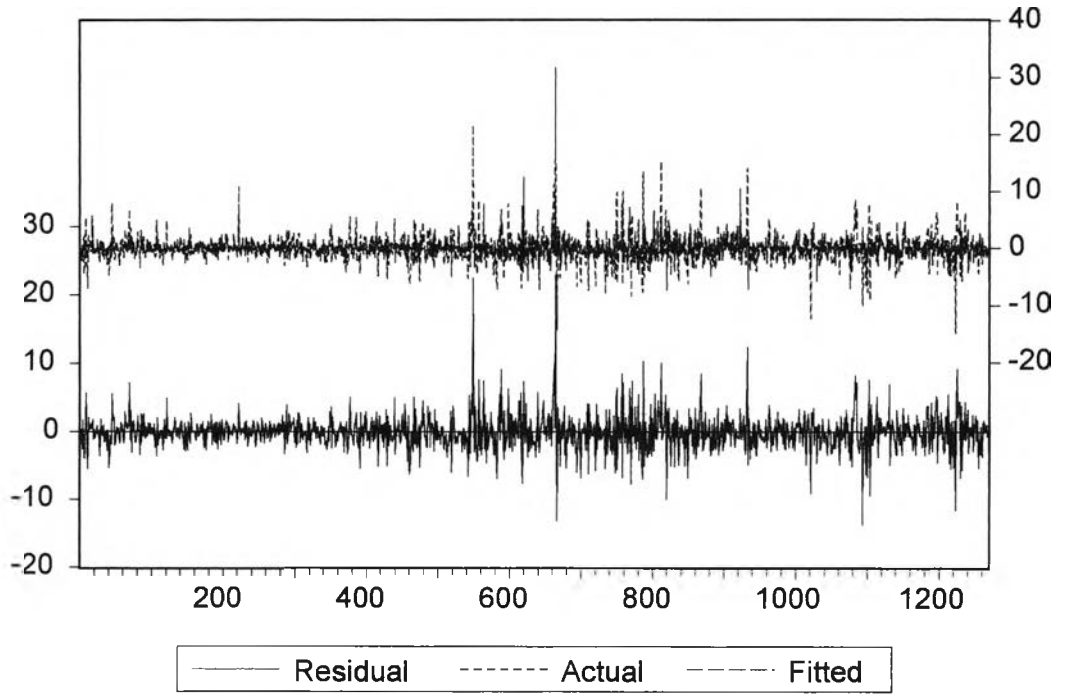


Figure 6.21

Residual return on ENERGY sector index of OLS and GRACH

OLS



GARCH

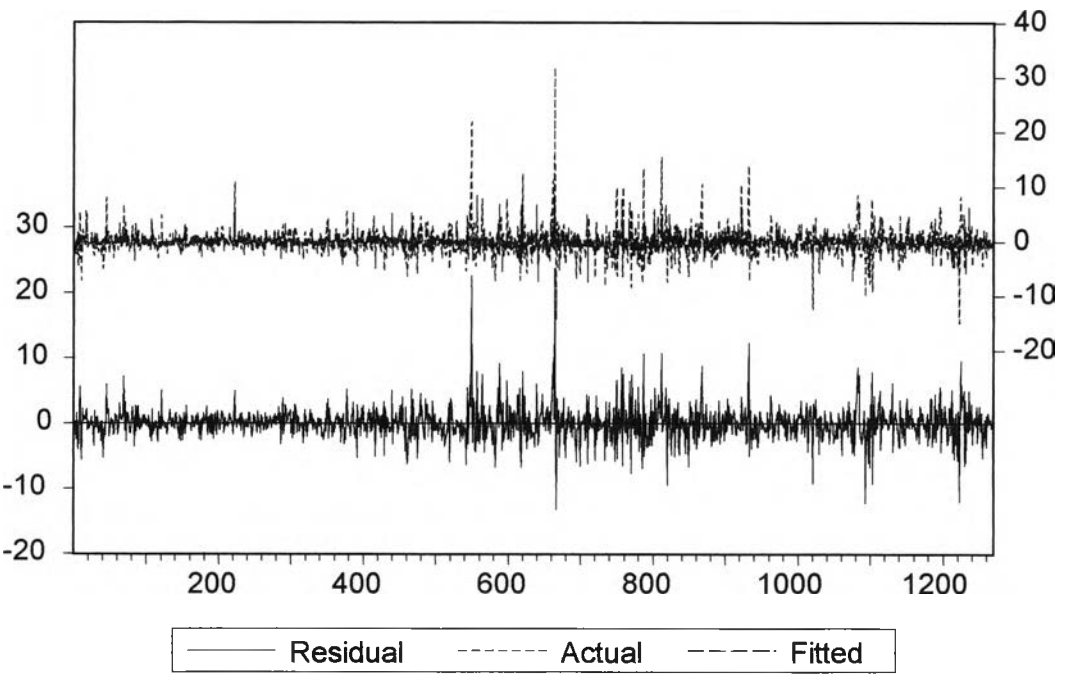
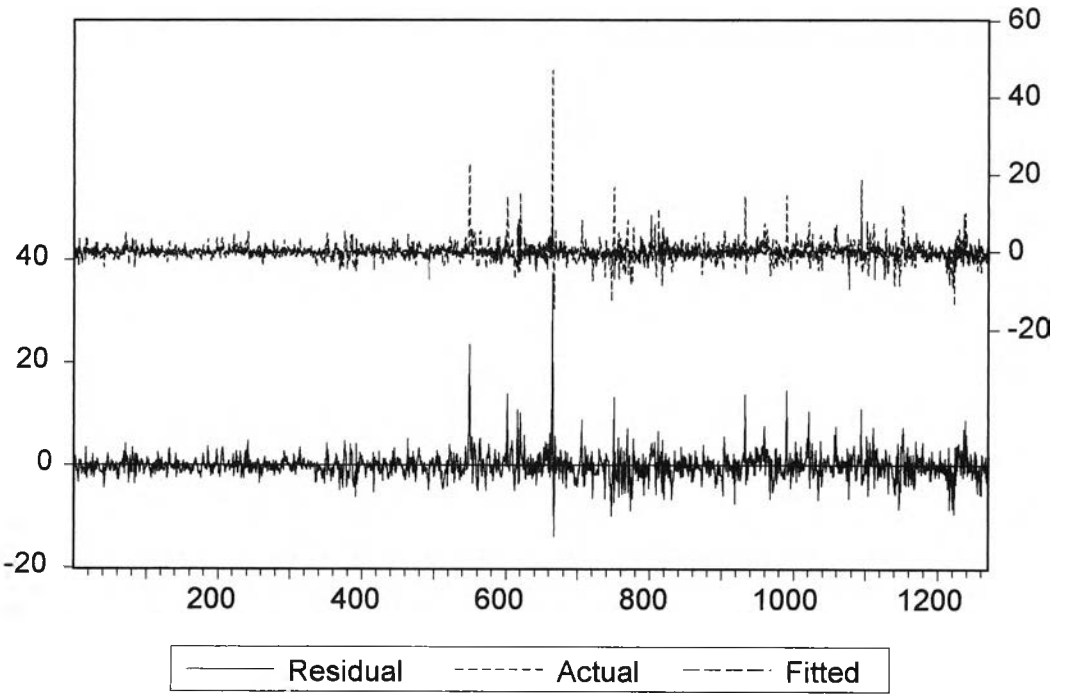


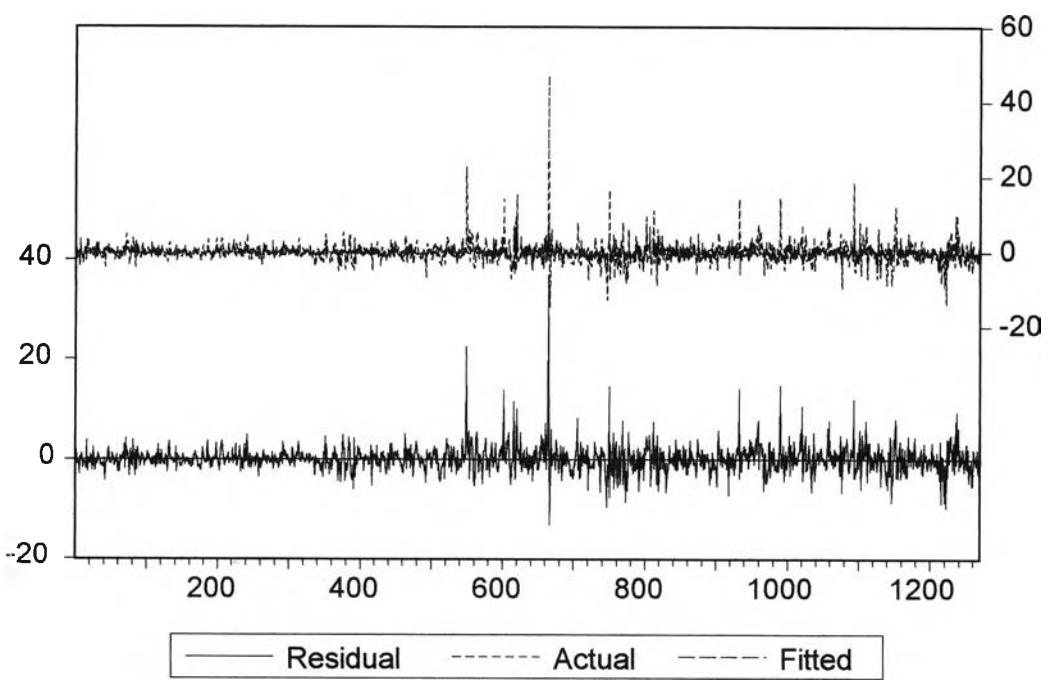
Figure 6.22

Residual return on ELECTRONIC sector index of OLS and GRACH

OLS



GARCH



Then we studied return of SET index and other sectors index by indicating which index had higher volatility. The result was shown below:

Table 6.18

Standard deviation on GARCH variance

INDEX	Coefficient of ε^2_{t-1}	Coefficient of σ^2_{t-1}	Standard deviation on GARCH variance	Ranking of Standard deviation GARCH variance
SET	0.1307	0.8743	1.0087	1
BANK	0.0801	0.9272	1.0017	3
FINANCIAL	0.1171	0.8722	0.9962	5
COMMUN	0.3850	0.1872	0.9986	4
ENERGY	0.2124	0.7528	1.0059	2
ELECTRONIC	0.1742	0.8166	0.9848	6

Table 6.18, show the coefficients on one lag time of square error term and coefficients on one lag time of square variance of GARCH model. Also there are standard deviation on GRACH variance that presents Energy sector index has a highest of volatility, followed by Banking, Communication, Financial, and Electronic sector index. All type of investors could use this result to make a benefit to their investment depending on what strategy they would use. For example, if foreign investors would like to play safe so they would pick up a stock that has a low volatility such as Financial and Electronic stocks. If foreign investors want to make a more profit then they would invest in the stocks that have a high volatility such as Energy stocks and Banking

After we computed the data, we displayed the result of correlation between SET index and other sectors index in Table 6. We found Financial sectors had the highest correlation with SET index, which was 0.9882 or 98.82%. Both sectors had positive correlation. Second was Banking sector with the correlation of 97.56%. The third was Communication sector that had correlation of 94.80%. Those were sectors that investors heavily interested. Energy sector had moderate correlation to SET index of 69.38%, but it still had positive correlation. Electronic sector, however, had moved the opposite way as SET index did. Its correlation was –22.96%. We concluded that investors would invest in Electronic sector when SET index declined. It implied that investor selected this sector when they had no promising alliterative.

Now let observe the result of the SET index by using OLS (Ordinary Least Square). First we found that local investors had the highest coefficient to SET index. Local investors used SET Index as a main indicator and then riding the curve. When SET index went up, local investors followed buy. On the contrary, local investors would follow sell when SET index declined. For other players, institution investors had negative coefficient to SET index (-4.03). The main reason was institution investors preferred buying stock when the market went down and selling it to other investors when market advanced. These institution investors were key players who made market back to equilibrium. The government might influence the institution investors.

For foreign investors, we discovered the moderate positive coefficient (1.93). This result could explain that foreign investors moved along SET index by follow buy and sell. Foreign investors or foreign fund would not consider if the stock price moved up or down since most of them were long term investor. So they held stock as long as they could unless they were hedge fund (Foreign speculator). Foreign investors could buy or sell their stocks at any of the price as they set since foreign fund manager focused that their portfolio should provide return closely or more than the return on SET index. This means their fund would have positive NAV.

Now, we did additional study by using GARCH model. GARCH was a technical term for reducing the error term. That meant computing data had less error. In the stock market, there were many news or information during trading hour and made price of stock to be volatile. We could not present the error term in number. This error might come from insiders trading, changed of company policy or manager, rumor and so on. With GARCH, we could see coefficient of net institution investors' buying/selling and net foreign investors' buying/selling remained stable, while the number of coefficient of local investors changed from 5.86 to -1.92. This meant the error term had come from buying or selling of local investors.

Then we studied the comparison between SET index with other sectors index. In banking sector, we found that the number of coefficient of local investors was higher than the other investors. It was 6.17 and it was a positive correlation to Banking sectors index. Coefficient of institution investors was 3.12 and foreign investors were 1.55. This was all kind of investors paid more attention to this sector. The local investors were the first; institution investors were the second and followed by foreign investors.

For Financial sectors, we found foreign investors were interested. (Table 6.18) Financial sectors had a standard deviation is 0.9962 and it was ranked number 5. This meant foreign investors loved to play with less volatile stock while local investors still kept in the trend of this sector. The local investors continued investing as long as other stock markets such as Dow Jone Industry Average, Nikkei 225, and Hang Seng advanced. For institution investors played in the opposite side of Financial sectors.

When the Nasdaq, Nikkei 225 and Hang Seng went up, local investors bought Communication stock sectors and so did foreign investors. While institution investors had negative coefficient to communication sectors.

Energy sectors, we discovered foreign investors had positive coefficient to this sector, no matter this sector had low correlation to SET index. Local investors and institution investors had high negative coefficient. Local investors and institution investors were not interested in this sector as a result of correlation to SET index was low.

Electronic sector, we found local investors and foreign investors were interested in his sector and also this sector had a positive coefficient to Nasdaq.

As we known foreign investors had positive coefficient to SET index, Banking sector index, Financial sector index, Communication sector index, Energy sector index, and Electronic sector index. When foreign investors wanted to move the market to go up or down, they had to use those correlations by looking at Table 6. Foreign investors bought Financial sectors, Banking sectors and Communication sectors. Those three sectors had high correlation to SET index.

Of cause local investors will be the first who invested prior to institution investors. The coefficient of local investors is 1.27 in GARCH model of RFIN. Then foreign investors would buy Banking sector as the same idea of Financial sectors and buying more in Communication sector to make market to be more interesting. What would happen if foreign investors met the resistant or selling in order to taking profit from local investors or institution investors? The way of these study foreign investors would buy Energy sectors and roll their money around

What happen if the market was not good but Nasdaq shoots up last night. Foreign investors may buy Electronic sector to wake the market. Then they followed buying the other sectors as we found above.

From this study we found that if foreign investors wanted to collect some stock in any sectors they might buy quietly or put very smooth order and conceal their interests. The bad thing for Thailand stock market was SET allows foreign investors and institution investors to do short selling. Foreign investors could borrow stock from custodian, sell stock then buy that stock back and return to custodian. It is the same way that they do for moving market. When foreign investors wanted to collect some stock they might sell Financial sectors and made a bit for Banking sector and waited for local investors to have a panic to sell Banking sector or other sector as Communication. And then they went to sell they stock the same of amount of what they spent on Banking sector and sell Financial sector. The result of this study would be helpful to explain the behavior of investor and they way they make a profit or moving market to their side.