LUND UNIVERSITY
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The Performance of Nordic Insurance Stocks

A perspective from the abnormal return and the equity beta

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Abstract: The paper examined two important components in the CAPM model, Jensen's alpha and equity beta, on the Nordic Insurance Index from 2003 to 2011. We found that the Insurance stocks in the Nordic markets provided abnormal returns of 15.39% annually during the first study period 2003-2005, whereas no abnormal return was found for the subsequent periods and it was also the case for the entire duration. However our dummy variables method indicated that the beta values were stable during the three study periods. Stable beta stocks reduce uncertainty of future returns. We believed including this kind of the assets (Nordic insurance stocks) when constructing the portfolios would, to some extent, reduce the uncertainty of the future returns.

Keywords: CAPM-GARCH model, Abnormal Return, Equity Beta

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1. Acknowledgement

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2. Introduction

The Capital Asset Pricing Model is widely used in portfolio management and financial academic research. Through the model we could capture the relative volatility of the return on a portfolio to the return on the market. The bigger the absolute value of the beta is the more fluctuation of the portfolio there is. For instance a small decline on the market return would contribute to a larger decrease on the portfolio return if the beta is greater than one. In addition, Jensen's alpha measurement of abnormal return is another coefficient to assess the portfolio. The abnormal return computes the difference between the return actually generated by the portfolio and the expected return that is predicted by the Capital Asset Pricing Model.

In the previous research, CAPM has already been used to examine the Risk/Return relationships for stocks in financial literatures. By testing the traditional CAPM, researchers often found significant Betas, but in the meantime, the significance of the abnormal return is very ambiguous. For example, Harrington (1983) examined the risk/return relationship for the life insurance stocks and he found no abnormal returns during his study period from 1961 to 1976, on the contrary, Hatfield (1997) concluded that the stocks outperformed the market during their study period from 1973 to 1994. This phenomenon is due to the fact that in the real financial world we cannot neglect and avoid the fact that the variance of the asset returns could change over time, showing a trend of volatility clustering. But the traditional CAPM is based on the assumption that the variance of the asset return is stable over time. Thus the assumption of homoscedasticity of the Ordinary Least Square method does not hold any more. The newly developed Generalized Autoregressive Conditional Heteroscedasticity of Capital Asset Pricing Model (CAPM-GARCH) is approximately more applicable in terms of doing the research on stock returns because it allows the error term free to vary in the modeling.

In 2006, Najand, Griffith and Marlett investigated the risk/return relationship for life insurance stock returns in the US for the period 1985 – 2003 using CAPM-GARCH model. They found life insurance stocks produced 7.96% abnormal returns for the whole period, 14.61% and 12.85% abnormal returns correspondently for the sub periods 1991-1996 and 1997-2003. At the same time the systematic risk was only

0.5759 during the whole investigated period, which indicated that the life insurance stocks return only had around half market risk during that time.

However, Najand et al (2006) studied the situation of the life insurance companies in the US, but how about the situation of insurance companies in Nordic Countries from 2003 to the present, and how their stocks had performed in terms of the beta and Jensen's alpha are still unanswered.

We think it is very interesting to explore these very important components in the CAPM model for the insurance companies in Nordic countries. And they will not only provide some implicit information regarding the stocks but also have valuable implications for the investment activities, especially during the bearish market such as financial crisis and the prevailing European Debt Crisis.

In all, this paper aims at examining the Risk/Return relationship for life insurance company stocks in Nordic countries from the beginning of 2003 to the end of 2011. And we divide them into three sub periods for further analysis. In the next section we will review some important articles concerning heteroscedasticity and the CAPM-GARCH model, and then followed by the methodology employed, Data Descriptions, empirical results, and we present the conclusions in the end of the paper.

3. Literature Review

The early use of the CAPM in academic research can be dated back to 1960s. Through the efforts of a plenty of people such as Sharpe (1963, 1964), Lintner (1965) and Mossin (1966), CAPM was gradually built and the basic idea of this model remained at the core of modern finance theory and practice. As Sharpe (1964) put out

"...Given homogeneous probabilistic predictions of the joint distribution of security returns, capital asset prices will adjust in equilibrium so that expected returns will be linearly related to security risks, where the risk of each security is measured by its beta value, indicating the sensitivity of the security's return to changes in the return on an efficient portfolio..."

CAPM is centralized on the measurement of the Beta value that is the ratio of risk return. However, CAPM is based on the crucial assumptions that asset or market returns are normally distributed variables and the variance of returns is held constant, which are actually often observed as contradiction to the reality where the returns are not normally distributed, that is why we easily find the heteroscedastic problems in our modeling. Just as Sharpe (1979) conceded, CAPM is usually termed the single index model and obviously an oversimplification of the reality.

Moreover, the later literatures also evidenced the defects of CAPM. Harrington (1983) was motivated by the use of CAPM in insurance rate regulations and so carried out a study of testing the relationship between property-liability insurer stock returns and systematic risk, unsystematic risk, and co-skewness for the period 1970-1983. He discovered that Insurer stock return patterns are consistent with the CAPM during the period 1980-1983, but inconsistent with the CAPM during earlier periods. His results implied that determining the fair rate of return solely on the basis of the CAPM might lead to incorrect results. Furthermore, the studies of Gibbons (1982), Basu (1983), Chan, Chen, and Hsieh (1985) all criticized on CAPM for the inability to explain the dynamic and varying returns. At the opposite end, the results of these studies came up with the same view that it is possible to construct a CAPM holds in a conditional sense, i.e., betas and the market risk premium vary over time, that is the Conditional CAPM, as suggested by Jagannathan and Wang (1996). Not a coincidence, Durack et al. (2004) made an extensive study on the Australian stock market borrowing the Conditional CAPM and the methodology from the study of Jagannathan & Wang (1996), their results showed that explanatory power of ordinary CAPM increased from 7.25% to 65.31%.

Additionally, another alternative approach can be often observed in prior literatures is the CAPM – GARCH which has the nature that allows variances of returns to vary over time and avoid heteroscedastic problems in the error term. As the results of Bollerslev et al. (1988) evidenced that the Beta values are time varying, therefore applying CAPM – GARCH can reduce the degree of biasness in the estimators.

Kongtoranin (2007) carried out a study on the Stock market of Thailand. In this study, the conditional CAPM and GARCH-CAPM were compared with traditional CAPM in order to determine the excess market return, although, the results reported the negative risk premiums both in Conditional CAPM and CAPM – GARCH as similar as the traditional CAPM, and only in some different years a positive risk premium were found, but were not statistically significant.

The other comparison study of Conditional CAPM and CAPM - GARCH was done by Morelli (2003) for the equity market in UK for the period January 1980–December 1999. The main objectives were to see if the GARCH betas differ from the unconditional betas, and to see if the market risk premium were positive. He found that GARCH and unconditional beta were correlated at 0.475 or 0.575 depending on the method used.

Najand et al (2006) explored how the stocks of life insurance companies had performed for the period 1985 – 2003 using CAPM-GARCH. They argued that using the traditional CAPM cannot find the abnormal returns, whereas by applying the CAPM – GARCH in their study, they found that the life insurance stocks provided 7.96% abnormal returns for the whole studied period, 14.61% for the sub period 1991-1996 and 12.85% for the sub period 1997-2003.

4. Research Methodology

4.1 The Traditional CAPM Model

The model explains the relative volatility of the return on a portfolio/asset to the return on the market. Mathematically,

$$E(r_i) = r_f + \beta_{im}\left[E(r_m) - r_f\right] \quad (1)$$

where,
$E(r_i)$ means the expected return on asset i,
R_f represents the return on risk-free asset,
$E(r_m)$ implies the expected return on the market

The easiest way to obtain the beta is to regress the risk premium on the market premium. We can further acquire the abnormal return by adding a constant term in the regression model, that is,

$$rp_i = \alpha + \beta_i * rm_i + \varepsilon_i \quad (2)$$

where,
rp_i means the risk premium,
The constant term represents the abnormal return,
rm_i implies the market premium

The estimators can be obtained through the Ordinary Least Square Method.

4.2 The "Problematic" Least Square method

It is undeniable that the Least Squares model plays an important role in modern econometrics theory, especially in the field of determining how much one variable changes with respect to a change in another variable or several variables. One of the assumptions of the Least Squares model is the homoskedasticity, which means the squared expected values of the error terms are identical at any given point. However this is not the case for the financial data, among others Andersen (1996) pointed out that financial asset return illustrates volatility clustering, which pictures the inclination of large changes in asset prices to follow large changes and small changes to follow small changes, that is to say, the variance of the asset returns are no longer a constant. Under this condition the assumption of homoskedasticity does not hold and if we continue to use the Least Squares model to predict the coefficients, say beta and alpha, in the CAPM model we would have some undesirable proprieties as a result of the heteroskedasticity such as narrowed standard errors and confidence intervals, leading to the false rejection of the null hypothesis. One of the modified methods dealing with the "special" distribution of the asset returns is Generalizes Autoregressive Conditional Heteroscedasticity model (GARCH), which allows the variance to change.

4.3 The Generalized ARCH (GARCH) model

Initially the ARCH model was developed to deal with the Heteroscedasticity in the series. The model was made up of the two parts, the mean equation and the variance equation:

$$y_t = \beta_1 + \beta_2 x_{2t} + \beta_3 x_{3t} + \beta_4 x_{4t} + u_t \qquad u_t \sim N(0, h_t) \tag{3}$$

$$h_t = \alpha_0 + \alpha_1 u_{t-1}^2 + \alpha_2 u_{t-2}^2 + \cdots + \alpha_q u_{t-q}^2 \tag{4}$$

The equation three is so-called the conditional mean equation and it can be any form that describes the dependent variable varies over time. At the same time the variance equation allows the variance to vary over time. However the model has some undesirable properties such as the difficulties in deciding the appropriate lags of the squared residual in the model, big q problems and the violation of the non-negativity constraints.

In order to conquer these undesirable properties Generalized ARCH (GARCH Model) model was introduced, where it allows the conditional variance to be relied on previous lags of itself:

$$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \alpha_2 u_{t-2}^2 + \cdots + \alpha_p u_{t-p}^2 + \beta_1 \sigma_{t-1}^2 + \beta_2 \sigma_{t-2}^2 + \cdots + \beta_q \sigma_{t-q}^2 \qquad (5)$$

The equation five is a GARCH (p,q) model, and we can put any form of the mean equation together with this conditional variance equation. In our analysis we employ the CAPM model as our mean equation, and it is usually considered sufficient to choose $p=q=1$ for the variance equation, i.e., a GARCH (1,1). Thus we form the CAPM-GARCH (1,1) model to calculate the conditional volatility for insurance index returns,

$$\begin{gathered} rp_t = \alpha + \beta rpm_t + \varepsilon_t \\ \varepsilon_t \sim N(0, h_t) \\ h_t = \omega + \theta_1 \varepsilon_{t-1}^2 + \theta_2 h_{t-1}^2 \end{gathered} \qquad (6)$$

where rp_t equals to the daily insurance index return subtracting the daily risk-free asset return, representing the risk premium of the valuated assets while rpm_t is equal to the market index return, known as the return of OMX Nordic 40, minus the daily return of the risk-free asset, indicating the market risk premium. The Equation six is a GARCH (1,1) of Capital Asset Pricing Model. In the model there is a term called alpha that measures the abnormal return of a stock or a portfolio over the theoretical expected return that is usually assessed by CAPM model. This measurement was first proposed by Jensen (1968) to evaluate the mutual fund managers' performance, where

Jensen's Alpha= Asset Return - [Risk-free rate + beta(Market Return-Risk-free rate)]* (7)

It should be pointed out that the stock or the portfolio is positioned above the

Security Market Line (SML) if the alpha is positive and significant, meaning the asset outperforms the market, on the other hand, it underperforms the market and is positioned under the Security Market Line if the alpha is negative and significant on the risk-adjusted basis. However we regard it as zero if it is statistically insignificant.

4.4 Portfolio Investment Beta and Premium Income Beta

The beta in the CAPM model measures the sensitivity of a security or a portfolio return changes in response to a market return changes. A negative beta indicates the negative co-movement relationship between the asset return and the market return while a positive beta implies the return of the asset tends to move together with the market return. For instance, we would say the portfolio or the single share is as risky as the market if the beta value turns out to be one. In this paper we would also like to see how the beta value behaves during the investigated period. This would reveal some risk characteristics of the insurance companies. Rosenberg and Guy (1976) found that the beta values are closely related to the industry characteristics and the risks within the industry. In fact, the prices of the stocks ultimately depend on the profitability of the business operations, therefore beta also reflects the profitability of the individual insurance company relative to the profitability of all the market companies as a whole. Cummins (1991) proposed that the beta value is a linear function of insurance company's beta of investment portfolio and the premium income beta. Thus it can be expressed as

$$I = I_u + I_i = r_A A + r_u P \tag{8}$$

where I is the total net profits, I_u means underwriting profits, I_I represents the profits on investment, r_A is the investment rate of return, A is total asset, r_u indicates the underwriting profits margin and P indicates the premium income.

Then we will have the return on equity if we divide each term in equation eight by total equity, that is,

$$r_E = \frac{I}{E} = r_A \frac{A}{E} + r_u \frac{P}{E} \tag{9}$$

If the insurance market is developed and matured, the proportion A/E and P/E should be relatively stable. And the equation ten also holds

$$\beta_E = \frac{cov(r_E, r_m)}{var(r_m)} = \frac{cov(r_A\frac{A}{E} + r_u\frac{P}{E}, r_m)}{var(r_m)} = \beta_A\frac{A}{E} + \beta_u\frac{P}{E} \tag{10}$$

Therefore the changes of the systematic risk of investment portfolio and underwriting profit margin are two of the main reasons accounting for the changes of the equity beta of the insurance firm. Generally speaking, premium income depends on the numbers of underwritings and the indemnifications. In a developed and matured insurance market there is a high rate of insurance coverage, thus the proportion between this two factors is relatively stable. The underwriting profits are less affected by the fluctuation of the market, therefore the beta value of underwriting, β_u, should be a small value. Furthermore the empirical study performed by Biger and Kahane (1978) shown that this beta hovers around zero in a matured market. Moreover during the special period such as the financial crisis the systematic risk of the portfolio investment, β_A, shall be increased to some extent, leading to the increased equity beta of the insurance companies. Therefore we construct the following dummy variables model to see whether there is a change of beta during the sub periods.

$$\begin{gathered} rp_t = \alpha + \beta rpm_t + \beta_1 D_2 rpm_t + \beta_2 D_3 rpm_t + \varepsilon_t \\ \varepsilon_t \sim N(0, h_t) \\ h_t = \omega + \theta_1 \varepsilon_{t-1}^2 + \theta_2 h_{t-1}^2 \end{gathered} \tag{11}$$

We can see that nearly everything is the same as model six except the two dummies, where D_2 represents the period 2006-2008 with value one for this period otherwise it is zero, whereas D_3 represents the period 2009-2011 with value one for this duration otherwise it is zero. Note that we have three sub periods but we can only set up the two dummies otherwise dummy variable trap may be a potential problem for us. Under this circumstance we default the period 2003-2005 as the basis year. Thus if either of the coefficients of these two dummies is significant we could say there is a change of beta during the respective period otherwise there is not any change happened if both of them are insignificant.

Our hypothesis is that equity beta would change to some extent. And abnormal return may exist during some periods but not for the whole, since investors would eventually process the information.

5. Data Description

As for the CAPM model we need the information of the market return, asset return as well as the price of the zero-beta asset that is also known as the risk free rate, in order to calculate the Jensen's alpha and the beta value. Therefore the daily prices of OMX Nordic 40, which is made up of the 40 largest and most traded firms of the Nordic list, are collected as the market price for the period from the beginning of 2003 to the end of 2011. At the same time we use the Nordic Insurance Index as the prices of the asset in the same duration, of which it consists the four biggest insurance companies[1] in the Nordic Region:

Table 1 Details of The Nordic Insurance Index

Company Name	Market Name	Traded Currency
Alm. Brand A/S	OMX CPH Equities	DKK
Topdanmark A/S	OMX CPH Equities	DKK
Trygvesta A/S	OMX CPH Equities	DKK
Sampo Group	OMX HEL Equities	EUR

As it can be seen from the table above, three of insurance companies are Danish companies traded on Copenhagen Stock Exchange while one is the Finnish company traded on Helsinki Stock Exchange. However currency is not a problem for the CAPM model since both market index and the insurance index are denoted in Euro. We convert two indices into the Continuously Compounded Return by using the following equation;

$$R_t = Ln(p_t/p_{t-1}) \quad (12)$$

Where P_t represents the price of the index at time t and P_{t-1} indicates the price of the index at a time that one period[2] before t, thus R_t evaluates the continuously compounded change in the index price from $t-1$ to t.

When it comes to the risk-free rate, we have many alternatives such as Treasury Bills, Interbank Offered Rate. Robert Brooks and David Yong Yan (1999) pointed out that the treasury curve and the London Interbank Offer Rate (LIBOR) curve are the two

[1] The only four insurance companies that are listed

[2] One period is equivalent to one trading day

most widely used proxies for the risk-free rate or the basis of a discount rate. Similarly we decide to use the daily 3-month Euribor[3] as the risk-free rate in our GARCH-CAPM model.

The study period consists of approximately 2268 trading days in 9-year time span, we split the whole period into three sub periods and each of them is with interval of three years. These are,

Table 2 The Divisions of The Study Period

Study Period	Abbreviations
02 Jan. 2003 – 30 Dec. 2005	Period One (P1)
02 Jan. 2006 – 30 Dec. 2008	Period Two (P2)
02 Jan. 2009 – 29 Dec. 2011	Period Three (P3)

We study each of the sub periods and the whole duration to see whether there exist abnormal returns by judging the significance of the Jensen's Alpha in the CAPM model. In addition we also would like to check the stability of beta in the model.

6. Empirical Results

We firstly check the stationarity of the series of return on the market index and the insurance index.

Table 3 Augmented Dickey-Fuller test statistic

Variable	ADF Test Statistics	P-Value
Return on Insurance Index	-46.258	0.00
Return on Market Index	-47.253	0.00

We choose the appropriate lags according to the Schwarz information Criterion. We can see from the table three that the two series are stationary since the p-value for each of them is smaller than 5% significance level. Thus this is the evidence that there is no trend and unit root contained in the series.

In the second step we plot the graph of the return on insurance index[4]. From the graph we can see that the amplitude of the return varies over time, showing the signs of ARCH effects. Scientifically we first illustrate some properties of the daily return of

[3] Refers to the Euro Interbank Offered Rate, which is bases on the average interests rates of more than 50 major European banks that borrow or lend capital from each other

[4] See Graph 2 for further information in the Appendix

the insurance index including the mean, standard deviation, skewness, kurtosis and normality, and then we performed the test of the Autocorrelations of Squared Portfolio Returns.

Table 4 Distributional statistics on daily insurance stock returns 2003-2011

Mean	0.031%
Median	0.071%
Maximum	8.093%
Minimum	-13.172%
Standard Deviation	1.512%
Skewness	-0.289
Kurtosis	9.411
Jarque-Bera (P-value)	3955.383 (0.00)
Observations	2291

We see from the table four that the series has a mean of 0.031% with the standard deviation of 1.512%. The skewness is -0.289 and it is a negative value, indicating that the left tail is particular extreme. The kurtosis is 9.41, which is larger than 3 implying a leptokurtosis, furthermore the J-B statistic is very large and the p-value is much smaller than 5% significance level indicating the rejection of the null hypothesis of the normality distributions. Non-normality is widely existed in financial data. We further check the autocorrelations of the squared insurance index returns.

Table 5 Autocorrelations of Squared Insurance Index Returns

	Autocorrelation	Q-Statistics	Prob.
1	0.154	54.581	0.000
2	0.092	73.928	0.000
3	0.143	120.68	0.000
4	0.143	167.39	0.000
5	0.184	245.14	0.000
6	0.199	335.95	0.000
7	0.120	368.80	0.000
8	0.093	388.79	0.000
9	0.185	467.84	0.000
10	0.112	496.70	0.000
11	0.135	538.82	0.000
12	0.157	595.48	0.000
13	0.122	630.08	0.000
14	0.124	665.30	0.000
15	0.088	683.19	0.000

From the table five we know that all the Q-statistics are significant since the p-values for all lags in the table are less than 0.05, which can reject the null hypothesis of no serial autocorrelations (no ARCH effects) suggested the presence of conditional heteroscedasticity in the series. The first order autocorrelation is 0.154, and they gradually decrease to 0.088 after 15 lags. At the same time they are all positive and it is the implication of the GARCH (1,1) model.

In the third step we run the CAPM-GARCH (1,1) model to obtain the estimators. Please note that we divide the period 2003-2011 into three sub periods, thus we run these intervals separately and then we run the whole period for comparison.

Table 6 Estimations and Residual Diagnostic Analysis of CAPM-GARCH (1,1) model from 2003-2011

Coefficients	**Period One 2003-2005**	**Period Two 2006-2008**	**Period Three 2009-2011**	**Overall Period 2003-2011**
α (p-values)	0.061% (0.00)	-0.028% (0.35)	-0.005% (0.87)	0.009% (0.59)
β (p-values)	0.702 (0.00)	0.684 (0.00)	0.696 (0.00)	0.685 (0.00)
ω (p-values)	0.001% (0.00)	0.0003% (0.00)	0.0002% (0.00)	0.0005% (0.00)
θ_1 (p-values)	0.284 (0.00)	0.054 (0.00)	0.051 (0.00)	0.083 (0.00)
θ_2 (p-values)	0.577 (0.00)	0.924 (0.00)	0.924 (0.00)	0.868 (0.00)
R^2	0.42	0.47	0.58	0.50
Residual Diagnostic Analysis of the CAPM-GARCH (1,1) model				
ARCH LM Test P-value	0.403 (0.53)	0.016 (0.90)	0.0002 (0.99)	0.238 (0.63)
Autocorr. Of Squared St. Res.[5]	Insignificant for all 15 lags? ***Yes***	Insignificant for all 15 lags? ***Yes***	Insignificant for all 15 lags? ***Yes***	Insignificant for all 15 lags? ***Yes***
T-statistics for The mean of Residual =0	-0.584 (0.56)	0.944 (0.35)	0.094 (0.93)	0.433 (0.67)

For the period one we see that the Jensen's alpha measurement of daily abnormal return is 0.061% and is also statistically different from zero under 5% significance level. And this portfolio is able to provide the investor with 15.39% abnormal return on an annual basis. Moreover during this period the insurance index is approximately 0.7 times as volatile as the market. The null hypothesis of zero beta is also rejected since the p-value is smaller than 0.05. Besides it is also clear that beta is statistically

[5] The output of Autocorrelations of Squared Standardized Residuals for each period can be found in the appendix

different from one, indicating that insurance firms has a significantly lower systematic risk than the market as a whole. Besides the coefficients on both lagged squared residual and lagged conditional variance terms in the conditional variance equation are significant, which indicates the rejection of the hypothesis of constant variance in both mean equation and conditional variance equations. At the same time diagnostic analysis shows the p-value of ARCH LM statistic is greater than 0.05, for which we cannot rejects the null hypothesis of no ARCH effects in the series. At the same time the table of the Squared Standardized Residual in the appendix also shows the p-values are around 0.5 or more for all lags, implying the null hypothesis of no ARCH in residual cannot be rejected. We can also see that the residual has a zero mean. In all we say that the residual can be viewed as a white noise process.

As for the second period we cannot find any abnormal return since the Jensen's alpha is negative and insignificant, however the beta value slight declines to 0.684, which is less volatile than the market. Additionally the model is well built since the coefficients of conditional variance equation are again statistically significant and it is a further suggestion of non-constant variance as well. The residual can also be considered as a white noise process because of the constant mean, variance and zero autocovariances.

Abnormal return again cannot be found in the third period from 2009-2011 because the coefficient of the alpha is still not significant under 5% significance level. However the other coefficients in the two models are significant. Beta indicates that the market is more fluctuated than the insurance index stock. The residual is a white noise process as well, which can be inferred from the output table above.

We also performed the overall period study to see whether there is an abnormal return. There was no superior return during the whole study period for the reason that alpha is not significant even under 10% significant level. However the model for the whole period is well composed. We notice that the insurance index is about 0.69 times as fluctuated as the market. The beta seems quite stable and it hovers around 0.69. Once again the residual of this model can also be regarded as a white noise process.

We also conduct the robustness test by using the Exponential GARCH model (see the results in the appendix). The results are in accordance with the previous results, where we also found the abnormal return only existed in the first period 2003-2005, although there was a slight difference in values. Furthermore the estimated beta values are more or less the same, thus we conclude that our results are reliable.

In order to see whether the beta is stable during the three periods we compose a dummy variables method to evaluate the beta and its significance.

Table 7 Estimations of the Dummy variables

Coefficients	Overall Period 2003-2011
α (p-values)	0.01% (0.57)
β (p-values)	0.668 (0.00)
β_1 (p-values)	0.023 (0.48)
β_2 (p-values)	0.024 (0.43)

The stability of beta is tested through the dummy variables method. We know that if the coefficients of the "additional term" are significant, then the coefficients mean the periodic beta adjustments. On the contrary the model will come back to the model two instead if the β_1 and β_2 are not statistically different from zero, implying that there is actually no change of beta values for each of the period.

Table seven provides us the results of the dummy variable regression. Still the alpha is not significant as expected during the whole period as we have estimated in the previous model. However the beta value during the overall period is around 0.66 meaning that the insurance index return is only slight more volatile than half of the market fluctuation. While we can clearly see that both periodic adjustments of beta are not significant since both p-values are much greater than 10% significance level. Under this condition we say the beta values of the insurance index return remained stable during the period from 2003 to 2011.

7. Conclusion

The paper has a concentration on investigating the abnormal return of the insurance industry in Nordic Countries as well as its beta stability during the period from 2003 to 2011 by using the CAPM-GARCH model. The previous study using the traditional CAPM model failed to find the abnormal return due to the fact that traditional CAPM model assumes the constant relationship between the risk and the return. However this is not the case in the real financial data, that is, financial data demonstrate volatility clustering. Heteroscedasticity is very common in the asset returns. Najand *et al* (2006) studied the abnormal return on life insurance stock in the US in a 19-year time span from 1985 to 2003 by employing the CAPM-GARCH model, finding that life insurance stock on average provided 7.96% abnormal return annually. In our paper we found that the Nordic insurance stock was able to provide 15.39% risk-adjusted return during the 2003-2005. We are unable to find any abnormal returns for the subsequent periods as well as the overall period. Thus, the insurance stocks did not outperform the market during the whole period.

At the same time, information on beta helps individual investors, institutional investors as well as the firm to make appropriate financial decision makings. For example, large beta stocks would provide more return if a bullish market were predicted to be in the future, on the contrary it would also cause severely losses if it is in a bearish market such as the market during the financial crisis. For our case we actually found that the equity beta of the Nordic insurance company did not change over time, where it moved around the 0.68 during the study period of 2003-2011. Present beta value could be a very good approximation for the future. As for the Nordic insurance index it has a relatively stable beta value (smaller than one) even during the period of the financial crisis, this may be due to the reason that the Nordic insurance companies have stable systematic risk of the investment portfolio and appropriate structure of earnings.

In all we only find the abnormal returns in the period one but we learn that the beta of this index remains stable during the study periods and it is also the case in the period of financial crisis. Thus we believe that including this kind of the asset (insurance stocks) when constructing the portfolios would, to some extent, reduce the uncertainty of the future returns, especially in a conservative investment portfolio.

8. References

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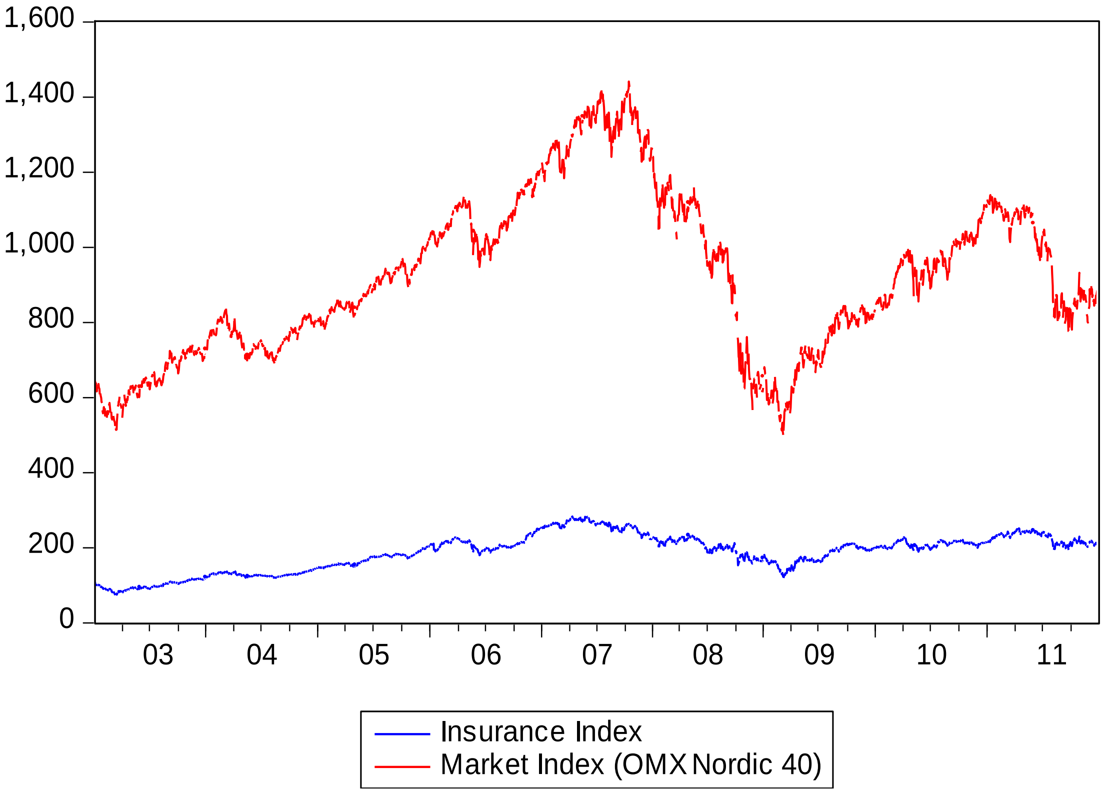
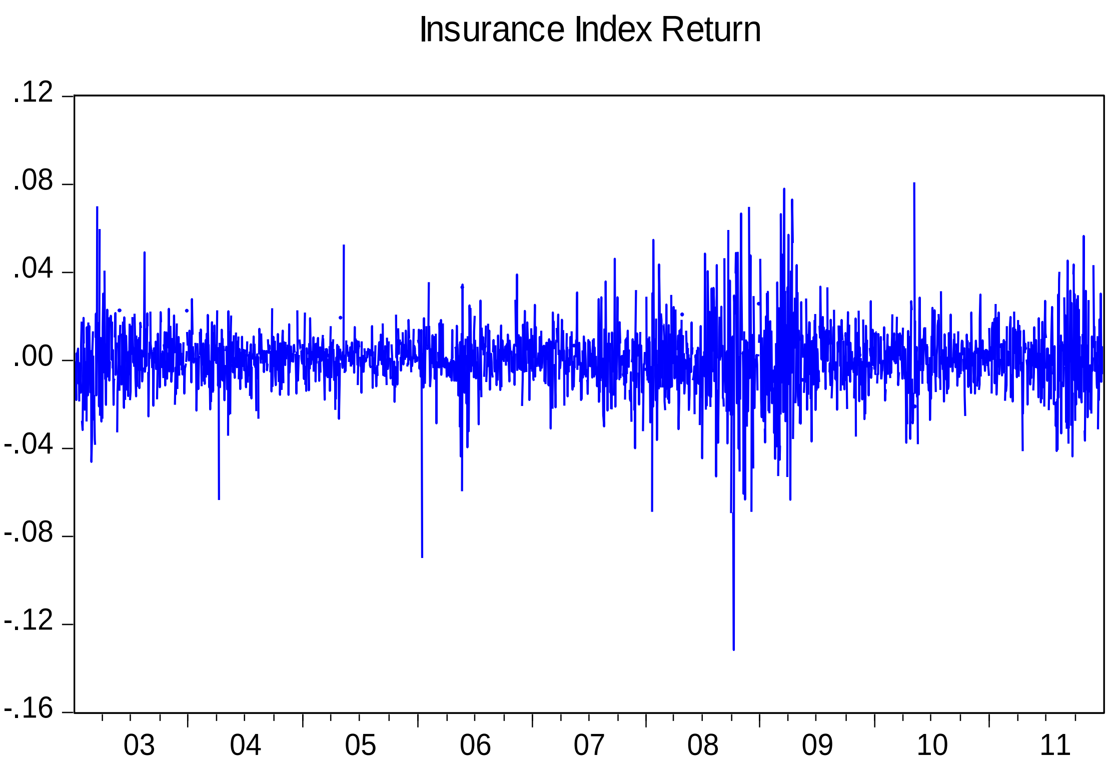
9. Appendix

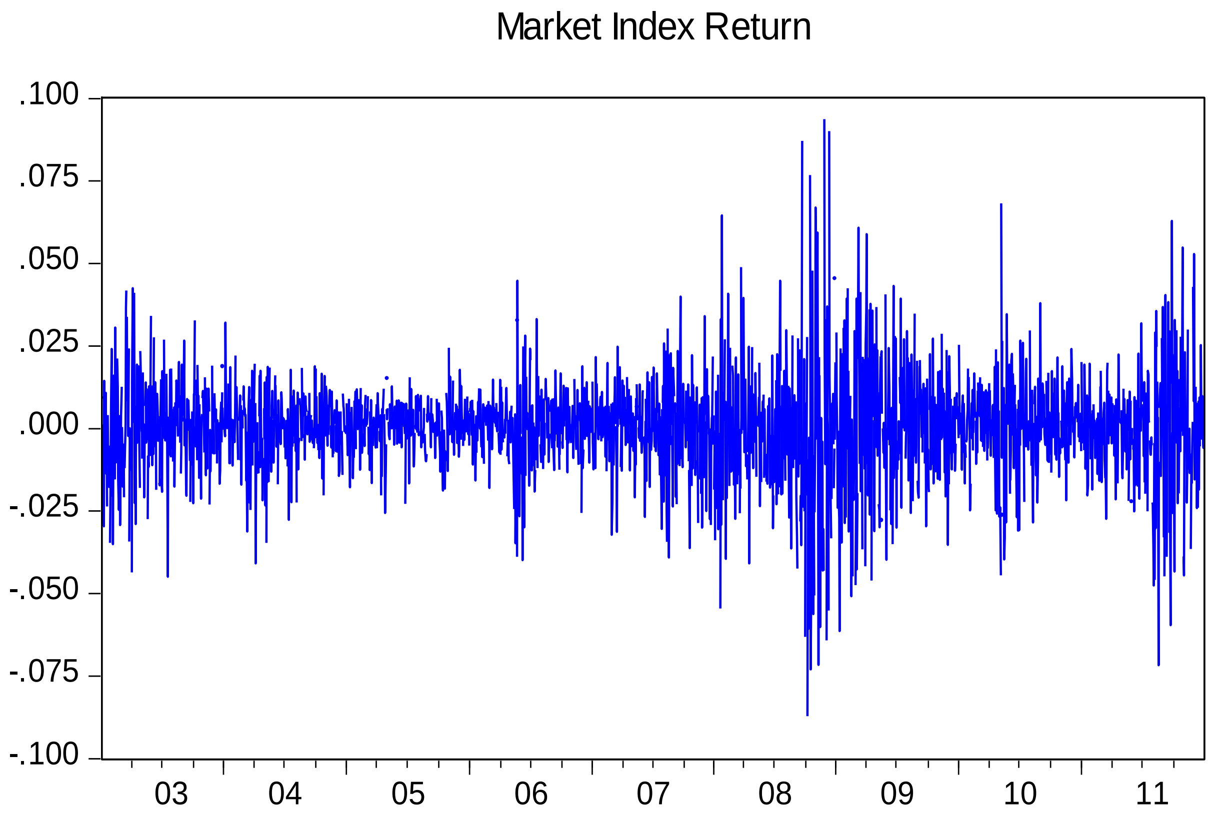
9.1 **Price Track of OMX Nordic 40 and Insurance Index**



9.2



9.3



9.4

Autocorrelations of Squared Standardized Residual 2003-2005

	Autocorrelation	Q-Statistics	Prob.
1	-0.023	0.4053	0.524
2	0.009	0.4741	0.789
3	-0.030	1.1540	0.764
4	-0.016	1.3415	0.854
5	-0.012	1.4486	0.919
6	-0.011	1.5440	0.957
7	-0.003	1.5534	0.980
8	-0.019	1.8219	0.986
9	0.031	2.5551	0.979
10	-0.008	2.6066	0.989
11	-0.005	2.6225	0.995
12	-0.005	2.6419	0.998
13	-0.026	3.1810	0.997
14	0.006	3.2133	0.999
15	-0.004	3.2258	0.999

9.5

Autocorrelations of Standardized Residual 2006-2008

	Autocorrelation	Q-Statistics	Prob.
1	-0.005	0.0160	0.899
2	0.000	0.0160	0.992
3	0.004	0.0276	0.999
4	-0.010	0.1072	0.999
5	-0.016	0.3024	0.998
6	0.007	0.3416	0.999
7	-0.014	0.4894	0.999
8	-0.019	0.7557	0.999
9	0.008	0.8061	1.000
10	-0.012	0.9137	1.000
11	0.027	1.4750	1.000
12	-0.011	1.5636	1.000
13	-0.004	1.5774	1.000
14	-0.012	1.6854	1.000
15	0.053	3.9009	0.998

9.6

Autocorrelations of Standardized Residual 2009-2011

	Autocorrelation	Q-Statistics	Prob.
1	0.000	0.0002	0.990
2	-0.015	0.1682	0.919
3	-0.019	0.4347	0.933
4	0.067	3.9073	0.419
5	-0.016	4.1170	0.533
6	-0.027	4.6777	0.586
7	-0.012	4.7812	0.687
8	-0.002	4.7857	0.780
9	-0.013	4.9125	0.842
10	-0.026	5.4521	0.859
11	0.011	5.5442	0.902
12	0.039	6.7401	0.874
13	-0.022	7.1323	0.895
14	0.036	8.1667	0.880
15	-0.057	10.725	0.772

9.7

Autocorrelations of Standardized Residual 2003-2011

	Autocorrelation	Q-Statistics	Prob.
1	-0.010	0.2382	0.626
2	-0.001	0.2395	0.887
3	-0.010	0.4773	0.924
4	0.001	0.4802	0.975
5	-0.014	0.9462	0.967
6	-0.005	0.9981	0.986
7	-0.007	1.1099	0.993
8	-0.012	1.4465	0.994
9	0.001	1.4492	0.998
10	-0.013	1.8230	0.998
11	0.010	2.0393	0.998
12	-0.007	2.1495	0.999
13	-0.010	2.3915	0.999
14	-0.001	2.3934	1.000
15	0.031	4.6331	0.995

9.8

EGARCH Model for Robustness Test

Coefficients	Period One 2003-2005	Period Two 2006-2008	Period Three 2009-2011	Overall Period 2003-2011
α (p-values)	0.058% (0.05)	-0.018% (0.58)	-0.012% (0.71)	0.020% (0.30)
β (p-values)	0.70 (0.00)	0.70 (0.00)	0.69 (0.00)	0.68 (0.00)
R^2	0.42	0.47	0.58	0.50