
Implied Expected Return on Equity on the Stockholm Stock Exchange

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Abstract

This thesis investigates the reasonableness of the expected returns on equity implied by the stock prices present in the bullish market of 2007 and the bearish market of 2009. With a sample of 66 companies listed on the Stockholm OMX Stock Exchange we deduct the implied return on equity expectations from a Residual Income Valuation model through reverse engineering. The reasonableness is evaluated through a statistical comparison between the resulting measures of implied expectations and how the companies have performed historically in terms of return on equity. The historical returns are hence used as a definition of reasonable expectations of future ROE. Through the analysis we conclude that the results in 2007 indicate that the prevailing prices are represented by return on equity expectations which are beyond the levels for which historical returns indicate reasonableness. For the results in 2009 we conclude that even though an extreme plunge in stock prices occurred, the expectations of companies' future returns were still stuck at levels above reasonableness. The prevailing high levels of implied return on equity expectations in 2009 is partially explained by the increase in bankruptcy risk in the companies, which pushes prices down, while investors' expectations of future operating performance are still higher than what is implied by historical measures.

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1. Introduction

1.1. Background

Throughout the history of stock markets there have been numerous periods of extreme price changes. During this millennium's first decade, the Swedish stock market experienced large fluctuations, starting off with the burst of the IT-bubble, then recovering to historically all time high stock price levels in 2007 and finally, with the outbreak of the present crisis, experiencing one of history's fastest drops in prices. Although this has caused a lot of trouble for many people, at least from a thesis point of view these extreme fluctuations give rise to some interesting opportunities to investigate the functionality of the market.

During periods of this extreme kind the traditional valuation models ability to explain price levels arising has been eagerly discussed by both experts and laymen. The fundamental approach as a foundation for investment decisions, with analysis of the company's financial statements, and with perfectly rational and unemotional investors, has been challenged by theories in behavioral finance. Within this area of financial theory investors are considered to be subject to market sentiment, i.e. the general attitude of the market, rather than being fully rational in their decision making. Especially for investigating and analyzing anomalies appearing in the stock market, these theories can offer interesting input on what may be the cause.¹

We find this contradiction of theories interesting and aim to further investigate the explanatory power the fundamental analysis has on market valuations of companies. Assuming that the investors base their decisions on fundamental analysis and use a commonly acknowledged valuation model, theory suggests that they would drive the prices to fundamentally correct levels. By taking the prices as given, one should be able to back out what market expectations are needed to satisfy these fundamentally correct prices. Looking at a period such as 2007 to 2009, where the market experienced one of history's largest drops in stock prices, one might expect the fundamental valuation to show difficulty in explaining the prevailing prices. In that case perhaps the theories emerging from the behavioral finance area can provide some suggestions to why such anomalies have appeared.

1.2. Purpose & limitations

¹ Malcolm Baker & Jeffrey Wurgler, (2007)

The purpose of this thesis is to evaluate the reasonableness in the implied return on equity expectations (E(ROE)) needed to reach the stock market prices prevailing on the Stockholm OMX Stock Exchange in 2007 and 2009, representing two different market settings. This is done by using the Residual Income Valuation (RIV) model and reverse engineer the E(ROE). We will use a sample of 66 companies listed on the Stockholm OMX Stock Exchange at April 16th each of the years.

As a starting point we assume that investors base their decisions on fundamental analysis and use a commonly acknowledged valuation model, the RIV model, to derive the fundamentally correct market price. This assumption enables us to reverse engineer the E(ROE) by the market actors given the market prices prevailing at these two points in time. We will then compare these to how the companies have performed historically, in terms of ROE.

To be able to make any statements about the reasonableness in the implied E(ROE) we conduct a statistical analysis which we base on a comparison between the implied E(ROE) and a 10-year average historical ROE.. The historical returns are hence used as a definition of reasonable expectations of the future ROE. We also analyze the difference between the implied E(ROE) for the two different points in time to see if the fluctuations in market prices are mirrored in the ROE expectations or if other factors taken into account in the valuation model have changed. In case of irregularities between the historical ROE and the implied E(ROE) we discuss possible reasons for why they occurred.

This leads to the concluding question formulation:

What were the implied expected returns on equity needed to reach the stock prices present on the Stockholm OMX Stock Exchange on the 16th April in 2007 and 16th April in 2009, and were they reasonable compared to historical returns on equity?

1.3. Previous Research

Research on the relevance of fundamental analysis for market valuation, often referred to as the value-relevance literature, has been discussed for decades and the opinions and findings are contradictory. Much of the academic literature states that the relevance of accounting numbers has declined during the last decades² but there are also studies showing the opposite.³

² Rimerman (1990)

In the area of evaluating implied components in a valuation model, Karlsson & Patomella⁴ reverse engineer the implied E(ROE) in a similar manner as this thesis aim to do. It is concluded that the implied E(ROE) in april 1994 for the sample of 63 companies on the Stockholm OMX Stock Exchange where high, but reasonable compared to historical levels of ROE. Skogsvik & Skogsvik⁵ compare an implied E(ROE) calculated through the RIV with a ROE calculated with an financial statement based prediction model, and investigates whether the difference observed can be used as basis for profitable investment decisions.

2. Theoretical References

Throughout history, numerous ways to determine the fundamental value of a company have been introduced. Today's most commonly used and accepted valuation models can be categorized into two main groups: ⁶

- The first group of valuation models can be categorized as empirically assessed models. These models are based on a relative association between stock prices and accounting numbers, which are used as comparison between different companies with similar characteristics. An example of this is the P/E-ratio.
- The second group is known as deduced valuation models. These models are based on the present value of the future returns which the stock holder will receive from holding stocks in the company. The RIV model is an example of this category, as the value of the company is based on the net dividends paid to shareholders.

As stated in the introduction section we will use the RIV model as foundation for our calculations of the implied E(ROE).

2.1. Residual Income Valuation model

The RIV, as described by Skogsvik⁷, can be derived from the calculation and valuation of net dividends paid to a company's shareholders. The net dividend is the expected dividends, less any equity contribution paid to the company, i.e. it is the net cash outflow from the company to the shareholder.

³ Collins & Maydew (1997)

⁴ Karlsson & Patomella (1994)

⁵ Skogsvik & Skogsvik (2009)

⁶ Skogsvik & Skogsvik (2008)

⁷Skogsvik (2002)

The RIV model relies on one major assumption; that *the clean surplus relation of accounting* holds. Under the clean surplus relation of accounting assumption, the change in book value of equity is fully explained by the net income, dividends paid and new issue of share capital. However, this is a simplifying assumption and literature suggests that this is not always the case. Items that affect the book value of equity without passing through the income statement, such as gains/losses related pension liabilities and currency translations, may interfere with the relationship.⁸ Also, if the number of outstanding shares is expected to change, the clean surplus relationship can not be assumed to hold.⁹ It should however be noted that in this thesis, the assumption that the clean surplus relationship holds is applied in order to be able to use the RIV model.

The basic outline of the RIV model consists of three components. The first is the opening book value of owner's equity at the valuation point in time. This component is denoted B_0 in our model and is calculated *ex dividend* (excluding dividend to be paid out, corresponding to the previous year) and includes any new issue from owners that have occurred in the time elapsed between the last annual report and the valuation date.

The second component is the present value of future residual income attributable to the equity owners. The residual income is mainly due to a "business goodwill" which enables the company to generate more money than the stockholder requires. To formulate this component we can first re-write the net dividends paid to equity owners as;

$$D_t - N_t = B_{t-1} + I_t - B_t = B_{t-1} * ROE_t - (B_t - B_{t-1})$$

where: D_t = the expected dividend paid to the shareholders at time t

N_t = the expected new issue of share capital in time t

B_t = the book value of shareholders equity at time t . It is determined *ex dividend* and includes any new issue of share capital.

I_t = accounting net income attributable to time period t

ROE_t = the return on shareholders' equity attributable to time period t ($= I_t / B_{t-1}$)

⁸Penman (2010) p.262

⁹ Ohlson (2000)

Then by further re-writing the expression above with $r_e + (ROE_t - r_e)$ instead of only ROE_t , we can express the net dividends ($D_t - N_t$) as $B_{t-1} * [r_e + (ROE_t - r_e)] - (B_t - B_{t-1})$. From this expression, the second part of the RIV model can then be derived, setting $B_{t-1} * r_e$ equal to the change in owners equity:

$$\sum_{t=1}^T \frac{B_{t-1} * (ROE_t - r_e)}{(1 + r_e)^t}$$

,which represents the sum of the present value of future years expected residual income, from time t_1 to time T when the company moves into a steady state with no future residual income due to “business goodwill”.

The third part of the model, which is referred to as the terminal value represents the present value of all expected residual income after the horizon point in time. This residual income is however not the result of any “business goodwill”, since this is assumed to have deteriorated towards zero, due to market forces driving this “value generator” down over time (e.g. through increased business competition). Instead it is constituted by the accounting measurement bias that occurs due to different measurement problems in accounting, as stated by Kent Skogsvik¹⁰:

“...explained by discrepancies between a “true and fair” matching of company revenues and costs, and the actual matching that takes place in the accounting reports.”

This *terminal value* in the RIV model is denoted as,

$$\frac{B_T * (\frac{V_T}{B_T} - 1)}{(1 + r_e)^T},$$

,where the component $(V_T/B_T - 1)$ represents the adjustment to the book value of owner’s equity for the accounting measurement bias, which is also commonly referred to as q , or the permanent measurement bias. A industry specific measure of this value is calculated by Runsten¹¹ by studying the relationship between share prices and accounting numbers, for different Swedish industries. In appendix VIII the industry classifications and the corresponding q values are stated.

¹⁰ Skogsvik (2002)

¹¹ Runsten (1998)

This gives us the complete Residual Income Valuation model as follows,

$$V_0 = B_0 + \sum_{t=1}^T \frac{B_{t-1} * (ROE_t - r_e)}{(1+r_e)^t} + \frac{B_T * (\frac{V_T}{B_T} - 1)}{(1+r_e)^T}$$

where V_0 is the fundamental value of the equity in the company.

2.1.1. Growth in Owners Equity

Each years opening book value of equity constitutes the foundation on which the corresponding year's return on equity is based. The clean surplus relationship states that the growth in owner's equity each year consists of the return on equity, less any dividend paid, plus all financial contribution from the owners. Hence owner's equity in the model grows in the following way;

$$BV_t = BV_{t-1} + (BV_{t-1} * (ROE - Payout Ratio))$$

where the payout ratio refers to how large proportion of the ROE the company will pay out to its owners as dividends.

2.1.2. Explicit forecast period and horizon point in time

An important factor in using the Residual Income Valuation model is the determination of the length of the explicit forecast period. Penman and Nissim¹² investigate the residual income and its development in a sample of American companies and they conclude that the residual income tends to converge towards zero over time. This is referred to as a mean reversion and it is preferable to choose an explicit forecast period that exceeds the time it takes for this to occur. After between four and six years they see that the residual income for the different companies are all fairly close to zero and tends to level out. This implies that the business goodwill in the companies have deteriorated and a steady state is entered. Karlsson & Patomella¹³ conclude, by using different explicit forecast periods in their calculations, that the implied E(ROE) tends to be most reasonable compared to actual historical performance when using periods between 10 and 20 years.

2.1.3. Extension of the RIV model - probability of failure

¹²Nissim & Penman (1999)

¹³Karlsson & Patomella (1994)

Neglecting the risk of a business failing, i.e. going into bankruptcy, in the RIV model is argued to result in a overvaluation of the company¹⁴. By extending the model to incorporate the risk of business failure (P_{fail}) one can hence retrieve a fairer valuation. The extended RIV model contains four parts (whereas the basic has three) where only the opening book value of owner's equity is unchanged. The expected residual income in future periods up until the horizon point in time is now conditioned on business survival, as is the terminal value. Thus to calculate the expected values, one needs to estimate the accumulated probability of survival in each period in the explicit forecast period until the horizon point in time. The entirely new parameter in this version is the expected value of negative residual income due to business failure. If business failure occurs then the net income for the year equals the loss of the opening book value of owners' equity and all consecutive residual income will be zero. The extended RIV model then becomes:

$$\begin{aligned}
 V_0 = & B_0 + \sum_{\tau=1}^T \frac{[\sum_{s=1}^{\tau}(1-P_{fail,s})]E_0(RI_{\tau}/surv(\tau))}{(1+r_e)^{\tau}} + \\
 & + \sum_{\tau=1}^T \frac{[\sum_{s=1}^{\tau-1}(1-P_{fail,s})]P_{fail,\tau}E_0(-(1+r_e)B_{\tau-1}/surv(\tau-1))}{(1+r_e)^{\tau}} + \\
 & + \frac{[\sum_{s=1}^T(1-P_{fail,s})]E_0(TV_T/surv(T))}{(1+r_e)^T}
 \end{aligned}$$

Where: $E_0(RI_{\tau}/surv(\tau))$ = the expected residual income in period τ conditioned on business survival.

$E_0(-(1+r_e)B_{\tau-1}/surv(\tau-1))$ = the expected negative residual income due to business failure in period τ conditioned on business survival in all preceding periods.

$E_0(TV_T/surv(T))$ = The terminal value in point in time T, conditioned on business survival.

¹⁴ Skogsvik (2006)

2.2. Calculation of the probability of failure

The probability of business failure can be estimated using a method developed by Skogsvik.¹⁵ By using a sample of 328 non-failure companies and 58 failure companies Skogsvik pin points a number of key ratios, presented in table 1 below, which can be observed in the companies' financial statements and together predict the companies' P_{fail} .

Key Ratio	Numerator	Denominator
Operating profitability R_T	Income before appropriations + interest expense	Average Total assets
Interest expense R_S	Interest expense	Average Current liabilities + average long-term liabilities + average deferred tax liabilities
Tax expense $s(1)$	Taxes payables + deferred tax expense	Income before appropriations
Inventory Intensiveness TVL	Average Inventories	Sales
Cash Position LI	Cash	Current liabilities - prepayments
Financial Structure SD	Shareholders Equity + untaxed reserves - def. Tax liabilities	Total assets
Growth in shareholders Equity E'	Change in shareholders equity during the period	Opening shareholders equity

Table 1. Ratios used in the multivariate prediction model for calculating P_{fail}

An additional ratio called the dev (R_S), which denotes a normalized difference between last years interest expense and the average of the interest expense of the preceding four years, is also included in the model. This is however only used when estimating the P_{fail} one year ahead in time and it has a small significance. Therefore one can exclude this ratio resulting in a somewhat simplified model, but without distorting the result.

Skogsvik develops a multivariate prediction model multiplying these ratios with certain coefficients depending on how many years ahead P_{fail} is to be predicted. The coefficients used in the model are presented in table 2.

¹⁵ Skogsvik (1987)

Financial Ratio	Prediction span					
	1 years	2 years	3 years	4 years	5 years	6 years
R_T	-4,3	-3,8				
R_S	22,6	14,5	13,2	16,1	13,5	17,5
$s(1)$			0,2			
TVL	1,6	0,7	1,3	0,8	0,9	1
LI			-0,5	-0,8	-1	-0,4
SD	-4,5	-2,9	-3,3	-2,5	-1,8	-1,5
E'	0,2					
$\text{dev}(R_S)$	-0,1					
Constant	-1,5	-1,1	-1,1	-1	-1,1	-1,4

Table 2. Coefficients used in the multivariate prediction model for calculating P_{fail}

This multivariate prediction model results in a probability index V , which follows a standard normal probability distribution, and results in a measure P_{fail} .

The probability derived from Skogsvik's model is however biased due to the fact that the sample used when calculating the probability is hardly ever a random sample.¹⁶ This bias has to be adjusted for by calibrating it with the proportion of the companies in the entire population of companies that actually ends up in financial distress. This is done in the following way;

$$P(fail)_{POP} = P(fail)_{EST} \left[\frac{\pi * (1 - prop)}{prop * (1 - \pi) + P(fail)_{EST} * (\pi - prop)} \right]$$

where, $P(fail)_{POP}$ = The calibrated probability of failure.

$P(fail)_{EST}$ = The probability of failure calculated through the model described above.

π = An estimated proportion of the companies in the entire population that fails during the period.

$Prop$ = The proportion of companies in the estimation sample that fails during the period.

2.3. Cost of equity

2.3.1. Capital Asset Pricing Model (CAPM)

¹⁶ Skogsvik (2005)

In the RIV model the cost of equity (r_e) is used to discount the future residual income created within the company. There are different models for determining the cost of equity, for example the Capital asset Pricing Model (CAPM), which is considered the most commonly used.¹⁷

CAPM describes the relationship between risk and expected return for a security, e.g. a stock, and since its introduction by John Lintner (1965a,b) and William Sharpe (1964)¹⁸ it has been used frequently in the pricing of risky securities.

CAPM consists of the risk free rate (r_f), the company's equity beta (β_e) and the expected market risk premium ($E(r_m) - r_f$), and together these components make up the expression for solving the expected required rate of return on equity $E(r_e)$:

$$E(r_e) = r_f + \beta_e * (E(r_m) - r_f)$$

The underlying idea of CAPM is that investors should be compensated both for the time value of money and for the risk taken on by investing in the stock. In the model the risk-free rate represents the time value of money. This is to display the compensation to the investors for placing money in any investment over a period of time, since the risk free interest rate is always possible to achieve by investing in e.g. government bonds. The remaining part of the CAPM expression symbolizes the compensation needed for the investor to take on the additional risk involved with investing in the stock. As the model shows, this second part is calculated by multiplying the stocks beta with the expected market risk premium ($E(r_m) - r_f$).¹⁹

2.3.2. Beta (β_e)

A stocks beta is defined as its expected returns sensitivity to the stock market returns, and is associated with the stocks risk. It is the covariance between the return from the stock and the market portfolio in relation to the variance of the return from the market portfolio;²⁰

$$\beta_e = \frac{Cov(r_{stock}, r_{market\ portfolio})}{Var(r_{market\ portfolio})}$$

The beta calculations are preferably made using monthly data from the past 60 months.²¹

¹⁷ Berk & DeMarzo (2007)

¹⁸ Berk, DeMarzo (2007) p.312

¹⁹ Penman (2010) p.110

²⁰ Penman (2010) p.112

²¹ Koller et. al. (2005) p.313

2.4. Wilcoxon Ranked Sign Test

The Wilcoxon Ranked Sign Test (WRST)²² is used to establish statistically significant tendencies in differences between sets of matched-pair data. While an ordinary sign test only takes into account the direction of a difference between a set of matched pairs, the WRST also takes into account the sizes of the differences and hence provides more information about the sample. For the WRST to provide as significant results as possible, it demands a symmetric probability distribution in the data set. This criteria can however be relaxed, although at the cost of the result quality.²³

To conduct the WSRT, the absolute differences between pairs in two data sets are calculated and assigned rank numbers with the smallest difference as number one. Thereafter the ranks are divided into two groups defined by if they represent a negative or a positive difference and the rank numbers are summed up in each group. The variable T is then introduced representing the smaller of the sums of ranks., which determines the final rule for rejection of H_0 through the resulting p-value.

If the samples consists of more than 20 matched pairs the WRST can be approximated using a normal distribution;

$$T_{min} \approx N \left(\frac{n(n+1)}{4} ; \frac{n(n+1)(2n+1)}{24} \right)$$

Where n denotes the number of pairs in the sample (except the ones where the difference is zero).

The p-value represents the probability of receiving a test result that is at least as extreme as the one obtained, given that the null hypothesis is true. Consequently, this means that the p-value also represents the probability of the null hypothesis being true given the observed result. Hence, the lower the p-value the less likely that the null hypothesis is true.

²² Newbold et. al. (2007)

2.5. Market Sentiment

Within behavioral finance, market sentiment represents the general attitude prevailing among investors in the market, and is expressed through movements in stock prices. If the market sentiment is considered bullish this would be indicated by rising prices and the opposite would apply for a bearish sentiment.²⁴

Whereas traditional finance models assume that investors act rationally and thereby will force capital market prices to equal the fundamental value derived, theories within this area have a different approach. The investors are not considered perfectly rational, or unemotional, rather they are subject to the prevailing sentiment in making their investment decisions. According to advocates of these models, there is no longer a question of whether stock prices are actually affected by the market sentiment or not, the question is rather to what extent.²⁵

Thus, according to these theories, the price trends are not solely based on the companies' actual performance, rather it is dependent on the sentiment of the investor community.

3. Method

3.1. Reversed Engineering

In order to establish a measure of the implied E(ROE) required to reach the prevailing stock prices in 2007 and 2009, we have used the concept of *reversed engineering*. This represents a way of determining the implied value of one variable in a given formula, assuming everything else is known.

To reach a value of the implied E(ROE), the prevailing stock prices are used as the fundamental value of equity in the RIV model, and the other components are calculated as described below. This enables calculations of the implied E(ROE) needed to reach the observed stock prices in our sample. The result is a 10-year future *average* E(ROE), as we use an explicit forecast period of 10 years.

3.2. Sample Data

This study includes companies listed on the Stockholm OMX Stock Exchange and the basis for selection is the traded volume of the companies during April 2009. The main reason why we

²⁴Investopedia

²⁵ Baker & Wurgler (2007)

have used April as basis for choosing our sample is that by then all of the companies have released financial information for the previous year, either in the form of an annual report or a year-end report. At the same time, until around the 20th of April the first quarter reports are yet to be released and hence no new information will affect the share prices as long as a date prior to this is used. The reason for choosing companies on the basis of traded volume is that we wish to avoid any problems that might occur due to illiquidity among stocks.²⁶

By sorting the companies on the large-, mid- and small cap lists after most traded in volume and choosing the 30 most traded on each list, a sample representing the entire span of company sizes on the Stockholm OMX Stock Exchange is obtained. As this study compares 2007 and 2009 the companies have to be listed in both these years. From the first sample companies that do not meet the following criteria are excluded.²⁷

- The company has to be non-financial, since these types of companies (Banks, Investment companies, and Insurance companies) often have complicated accounting methods.
- The company must follow January – December reporting period to lower the risk of distorting affects from asymmetric flow of information.
- For the calculations of beta, historical ROE and P_{fail} there has to be sufficient data available for the company (for a more detailed discussion on this see each section below).

After taking all the above criteria into account the final sample constitute the 66 companies presented in table 3 below.

²⁶ Koller (2005) p.315

²⁷ Karlsson & Patomella (1994)

LargeCap	MidCap	SmallCap
ABB Ltd.	Eniro AB	Precise Biometrics
Assa Abloy AB	Sas AB	Rottneros AB
Alfa Laval AB	PA Resources AB	Pricer AB
Astra Zeneca PLC	Kungsleden AB	Karo Bio AB
Atlas Copco AB	JM AB	Tricorona
Boliden AB	Net Insight AB	Fingerprint Cards AB
Electrolux AB	PEAB AB	Biotage AB
LM Ericsson Tele	Intrum Justitia AB	Sensys Traffic AB
Getinge AB	Billerud AB	Artimplant
Lundin Petroleum AB	Nobia AB	Biophausia AB
Modern Times GRP MTG	New Wave Group AB	Cision AB
Scania AB	Gunnebo AB	Modul 1 Data AB
SKF AB	Haldex AB	Acando AB
SSAB Svenskt Stål AB	Betsson AB	Anoto Group AB
Sandvik AB	Axis AB	Mobyson AB
Securitas AB	Q-Med AB	Aspiro AB
Skanska AB	Klövern AB	Micronic Laser System
Svenska Cellulosa AB	Neonet	Proffice AB
Swedish Match AB	Munters AB	Rederi AB Trans.
Tele2 AB	Bioinvent Intl.	Sigma AB
Telia Sonera AB	Active Biotech AB	Vitrolife AB
Volvo AB		Know It AB
		Raysearch Lab

Table 3. Final Sample used in study

3.2. Valuation Date

This thesis investigates market settings with historically high prices on the Stockholm OMX Stock Exchange in 2007 and low prices in 2009. Thus, all companies need to be valued at the same date in each respective year for the results to be comparable between the companies. Also, to be able to draw any conclusion about the differences between the two years it is preferable to value the companies at the same time both years to get as comparable output as possible, in terms of information availability. A date after the annual reports are presented and prior to the releases of first quarter reports is preferred as this ensures that the same amount of information is available for all companies.

Using these criteria we have chosen the observation date of 16th April. At this date the Stockholm OMX index was at a historically high level in 2007 and low in 2009.



Figure 1. Development of Stockholm OMX index 2006-2010

Source: <http://www.nasdaqomxnordic.com/>

3.3. Opening Book Value of Equity

The opening book value of equity, which composes the first part of the RIV, is adjusted for any net dividends attributable to the last year. Thus, in the opening book value of 2007 the proposed dividend for 2006 is subtracted and in the opening book value 2009 the proposed dividend for 2008 is subtracted for all companies in the sample.

As a last step in the valuation the present value of the dividend is added back to the fundamental value of equity if the dividend is paid out to the equity holders after the valuation date in 2007 and 2009 respectively.

Accordingly, if any other transactions, such as new issues or repurchases, has been made between the end of the previous year and the valuation date 2007 and 2009 this amount is also adjusted for.

3.4. Dividends

To calculate the growth in equity in the RIV model the companies pay out ratio is incorporated to calculate how much of the ROE that stays in the company each year and allows it to grow. The payout ratios used are estimations of an expected payout ratio level over the coming ten years and based on the companies' long-term dividend target stated in their annual reports. For companies without an explicit dividend policy, the input has been based on the historical levels of the pay-out ratio.

3.5. The Terminal Value & Explicit Forecast Period

We have chosen an explicit forecast period of ten years in this thesis hence assuming that all of the companies in our sample, regardless of what phase in the business cycles they are in, will have reached a steady state by that time. Thus, the companies are believed to have residual income due to business goodwill for ten years before they converge to a steady state level close to zero. This assumption, that all the 66 companies in our sample will have excess returns for 10 years before entering a steady state with residual income only due to the permanent measurement bias, is a strong assumption and we appreciate that this can have implications on our results.

The fact that our sample consists of companies from both large-, medium- and smallcap suggests that the companies are in different phases of their business cycle and hence can be expected to reach a steady state at different times. As the larger industry companies such as ABB or Alfa Laval can be considered to be close to a steady state, smaller and younger companies such as Aspiro or Biophausia may be considered to have a much longer period before entering steady state.

Even if this will affect our result we see it as the only option to have the same explicit forecast period for all companies, since an individually estimated time period for each company would force us to make subjective forecasts of the companies operations and this is something we want to avoid as far as possible.

To appoint a q value to each company, we have made an industry classification of the companies in our sample which we have based on Runstens classification.²⁸ In later years, a global harmonization of accounting standards has started and all Swedish listed companies have adopted the IFRS accounting standards. With the introduction of the IFRS accounting standards many principles changed in the way assets are recognized in the companies' balance sheets. These changes may distort the measurement biases calculated by Runsten, especially in companies with a large amount of, for example, biological or intangible assets. As one goal of the IFRS is to move towards more market value based accounting, this will cause an overall lowering of the PMB values (since the difference between the accounting value and the market value thus will be lowered). Although this will affect our result, we do not consider ourselves to be able to make any qualified estimation of how to adjust the values calculated by Runsten in order to make our estimations any more reliable. As any attempt would have to be considered

²⁸ Runstens (1998) p.316

pure speculation we have decided not to make any adjustment, but rather bear in mind in the analysis that this fact will have an impact on the results.

3.6. Probability of Failure

The calculations of the key-ratios for P_{fail} are all based on values from the companies' annual reports and used in the multivariate prediction model developed by Skogsvik.²⁹ This method suits the purpose of this thesis good since the probability can be derived directly from accounting numbers and it can with fairly good significance predict the P_{fail} six years from the valuation date. We have simplified the estimation of the P_{fail} from year 7 up to steady state by setting them equal to the P_{fail} year 6.

To calibrate the P_{fail} , we use statistics from Statistics Sweden agency.³⁰ We obtained the proportion of the limited liability companies registered in Sweden in the beginning of 2007 and 2009 that filed for bankruptcy in the following year. We appreciate that the proportion of the total number of limited liability companies might not be exactly representative of the companies registered on the Stockholm OMX Stock Exchange³¹ but we still believe it to be a good approximation.

Skogsvik³² bases his study on a definition of business failure as “a situation where the capital value (market value) of a necessary capital injection is less than the actual capital requirement [...] Accordingly, a failure company is closed down or survives with the help of government support”.³³ The definition we chose to follow characterizes a failure company only as a company that actually files for bankruptcy, and we understand that this might have implications on the resulting calibrated p-fail.

3.7. Beta, r_f , r_m and r_e

All data used for calculation of the company beta β_e , i.e. development of stock prices, indices, and currencies, is downloaded from Thomson DataStream, i. The individual stocks returns are regressed against the return on the MSCI World index over a time period of 60 months.³⁴ The reason why the MSCI World index is used instead of a Swedish index is that a local index might

²⁹ Skogsvik (1987)

³⁰ Statistics Sweden

³¹ Skogsvik (1987) p. 151

³² Skogsvik (1987)

³³ Skogsvik (1988)

³⁴ Koller et. al. p.314

result in measuring the companies' sensitivity to a few industries overrepresented in a local market like Sweden, rather than to the market-wide systematic risk.³⁵ Since the companies are listed in Sweden and hence are denominated in SEK, while the MSCI World is denominated in USD, we use the trailing currency development between these currencies in order to rebase the index to SEK figures.

Some companies though have not been listed for more than a year or two. In these cases we have chosen to exclude them from our sample as these coincide with the companies that lack sufficient data on historical ROE and to make the P_{fail} calculations.

In order to determine a value of the risk-free long term real borrowing rate we use the 10-year historical average of the Swedish 10-year government bond rate,³⁶ between April 1997 and April 2007 and between April 1999 and April 2009. This data has been gathered from the Swedish Riksbank.³⁷ This gives us a risk free long term nominal borrowing rate of 4,46 % for 2009 and 4,78 % for 2007.

To estimate the expected market risk premium we measure and extrapolate historical excess returns, i.e. the return on the MSCI World Index (MSCI World index is compiled of 1500 “world” stocks), and subtract the return from a risk-free investment from this index.³⁸ Excluding the extreme value of 2009 (when the stock market collapsed) the measure of the market excess return reached is about 4,42%, which could be considered in line with the consensus in finance literature which tends to be within the range 4,5 – 5,5 %.³⁹

Though it may seem inconsequent to use the local risk-free rate in one calculation and the US risk-free rate in another, we consider it to be the most appropriate approach. Using only local figures for calculating the market excess return risks skewing the measure due the risk of the market composition of a local index being too focused on some industries.⁴⁰

3.8. Historical ROE

To establish the historical measures of ROE for each company we gathered data on each company's opening book value of common equity for the previous ten years and the level of net

³⁵ Koller, et. al. p.316

³⁶ Koller et. al. p.304

³⁷ Swedish Riksbank

³⁸ Koller et. al. p.304

³⁹ Koller et. al. p.312

⁴⁰ Koller et. al. p.316

income attributable to common equity holders for the corresponding years. The measure of ROE is calculated as;

$$ROE = \frac{\textit{Return to common Equity holders}}{\textit{Opening book value of common Equity}}$$

The historical ROE is used as the reference point in our analysis, and thus we have calculated a 10-year historical average in order to match the 10-year average implied E(ROE) resulting from the valuation model. Though, it is not possible to retrieve a 10-year average for all companies as they have not all been listed on the stock exchange for that long. In these cases we have shortened the period for historical ROE calculations somewhat.

A discussion about the usage of historical ROE as a measure of reasonableness is held in section 4.3.2. below.

4. Result and Analysis

4.1. Results – Implied return on equity 2007 & 2009

In table 4 and 5 below, the implied E(ROE)s obtained from our RIV for all the companies in the sample is presented. The historical average ROE for the last ten years is also presented beside the implied expected ROE for each respective year. The data inserted in the calculations to receive the result below are all summarized in appendix I & II.

4.1.1. Result 2007

Company	Implied E(ROE) 2007	Historical ROE 2007	Company	Implied E(ROE) 2007	Historical ROE 2007
ABB Ltd.	98,10%	15,73%	Gunnebo AB	16,69%	14,79%
Assa Abloy AB	37,35%	15,57%	Haldex AB	9,47%	13,44%
Alfa Laval AB	14,79%	13,31%	Betsson AB	24,67%	6,78%
Astra Zeneca PLC	87,08%	30,20%	Axis AB	70,35%	12,43%
Atlas Copco AB	19,96%	16,59%	Q-Med AB	65,31%	19,09%
Boliden AB	25,61%	5,22%	Klövern AB	10,69%	18,91%
Electrolux AB	32,79%	15,96%	Neonet	47,92%	-2,99%
LM Ericsson Tele	61,49%	25,18%	Munters AB	10,48%	26,37%
Getinge AB	35,63%	27,83%	Bioinvent Intl.	30,52%	-40,02%
Lundin Petroleum AB	-8,55%	33,40%	Active Biotech AB	71,25%	-41,71%
Modern Times GRP MTG	37,38%	16,03%	Precise Biometrics	19,92%	-80,48%
Scania AB	7,30%	22,13%	Rottneros AB	-10,57%	4,04%
SKF AB	28,69%	15,57%	Pricer AB	11,19%	-69,77%
SSAB Svenskt Stål AB	27,65%	10,17%	Karo Bio AB	29,01%	-44,24%
Sandvik AB	50,81%	17,36%	Tricorona	9,85%	-21,71%
Securitas AB	31,45%	12,77%	Fingerprint Cards AB	20,16%	-28,68%
Skanska AB	37,35%	19,56%	Biotage AB	18,44%	-20,16%
Svenska Cellulosa AB	3,01%	12,21%	Sensys Traffic AB	45,64%	-46,98%
Swedish Match AB	65,57%	39,74%	Artimplant	35,83%	-37,78%
Tele2 AB	12,75%	2,36%	Biophausia AB	14,06%	-83,26%
Telia Sonera AB	17,00%	11,53%	Cision AB	12,53%	3,36%
Volvo AB	-1,40%	13,61%	Modul 1 Data AB	17,12%	-29,26%
Eniro AB	42,80%	17,65%	Acando AB	18,99%	3,27%
Sas AB	-11,39%	-3,46%	Anoto Group AB	28,15%	-50,62%
PA Resources AB	30,04%	23,30%	Mobyson AB	17,88%	-66,26%
Kungsleden AB	12,72%	28,16%	Aspiro AB	2,81%	-99,25%
JM AB	44,86%	15,29%	Micronic Laser System	18,77%	5,05%
Net Insight AB	59,73%	-80,36%	Proffice AB	42,49%	6,44%
PEAB AB	15,73%	19,86%	Rederi AB Trans.	9,68%	2,48%
Intrum Justitia AB	40,60%	16,15%	Sigma AB	21,17%	-3,77%
Billerud AB	7,95%	16,04%	Vitrolife AB	31,56%	-4,63%
Nobia AB	10,86%	22,97%	Know It AB	22,99%	12,58%
New Wave Group AB	29,01%	23,77%	Raysearch Lab	29,97%	44,95%

Table 4. Implied E(ROE) and ten year historical ROE for the sample companies 2007

4.1.2. Result 2009

Company	Implied E(ROE) 2009	Historical ROE 2009	Company	Implied E(ROE) 2009	Historical ROE 2009
ABB Ltd.	83,10%	21,76%	Gunnebo AB	3,02%	11,79%
Assa Abloy AB	19,70%	14,80%	Haldex AB	2,60%	9,56%
Alfa Laval AB	36,93%	16,06%	Betsson AB	63,10%	12,14%
Astra Zeneca PLC	86,15%	30,20%	Axis AB	73,44%	13,13%
Atlas Copco AB	51,57%	18,23%	Q-Med AB	16,62%	15,79%
Boliden AB	8,94%	7,23%	Klövern AB	9,36%	18,91%
Electrolux AB	14,38%	15,96%	Neonet	29,45%	4,51%
LM Ericsson Tele	11,37%	18,85%	Munters AB	21,68%	22,34%
Getinge AB	21,36%	25,28%	Bioinvent Intl.	19,83%	-28,78%
Lundin Petroleum AB	-3,23%	21,82%	Active Biotech AB	37,29%	-69,44%
Modern Times GRP MTG	11,10%	22,73%	Precise Biometrics	91,08%	-76,09%
Scania AB	35,96%	22,54%	Rottneros AB	-10,23%	1,29%
SKF AB	43,64%	18,39%	Pricer AB	5,33%	-53,11%
SSAB Svenskt Stål AB	6,16%	18,43%	Karo Bio AB	21,94%	-56,15%
Sandvik AB	84,40%	20,10%	Tricorona	23,52%	-15,96%
Securitas AB	27,67%	12,16%	Fingerprint Cards AB	1,52%	-32,63%
Skanska AB	19,58%	19,56%	Biotage AB	-6,93%	-17,06%
Svenska Cellulosa AB	-2,72%	11,41%	Sensys Traffic AB	31,47%	-36,84%
Swedish Match AB	133,47%	43,09%	Artimplant	23,55%	-36,51%
Tele2 AB	8,78%	3,87%	Biophausia AB	7,72%	-52,56%
Telia Sonera AB	6,83%	12,45%	Cision AB	-5,54%	1,72%
Volvo AB	14,27%	12,51%	Modul 1 Data AB	2,49%	-29,26%
Eniro AB	28,43%	17,65%	Acando AB	5,80%	20,74%
Sas AB	-13,39%	-3,46%	Anoto Group AB	7,88%	-23,93%
PA Resources AB	15,40%	23,30%	Mobyson AB	-0,51%	-90,95%
Kungsleden AB	9,91%	26,45%	Aspiro AB	-1,78%	-78,64%
JM AB	18,14%	23,94%	Micronic Laser System	-1,07%	-1,17%
Net Insight AB	26,03%	-72,85%	Proffice AB	13,13%	10,05%
PEAB AB	18,85%	24,30%	Rederi AB Trans.	-0,26%	9,35%
Intrum Justitia AB	18,15%	22,32%	Sigma AB	5,91%	-1,20%
Billerud AB	-2,65%	12,55%	Vitrolife AB	6,06%	8,47%
Nobia AB	9,47%	22,97%	Know It AB	9,37%	22,62%
New Wave Group AB	3,35%	23,23%	Raysearch Lab	27,32%	40,62%

Table 5. Implied E(ROE) and ten year historical ROE for the sample companies 2009

4.2. Comparison & Analysis

In the following section the implied E(ROE) received from the RIV model will be compared to the 10-year average historical ROE for each of the companies in the sample. A comparison is also made between the two points in time – 16th April 2007 and 16th April 2009 – to see if there are any significant differences between the implied E(ROE) in different market environments and how these are mirrored in the valuation model.

After having conducted a test of the symmetry in our samples probability distribution we can conclude that there is skewness, to different extents, in the data sets but we still believe that the WSRT can provide us with a reliable result. Histograms showing an overview of the distributions are presented in appendix IX.

4.2.1. Hypotheses

Under the assumption that the investors act on the fundamental value and base their decisions on valuation models such as the RIV our hypothesis is that the implied E(ROE) in April 2007 will exceed the historical ROE, because of the historically high prices in the market at the time. Hence, for 2007 we state the following hypothesis (*Hypothesis I*),

$$H_0: \text{historical ROE} \geq \text{implied E(ROE)}$$

$$H_1: \text{historical ROE} < \text{implied E(ROE)}$$

Seeing the dramatical decrease in prices between April 2007 and April 2009 we anticipate a corresponding decrease in implied E(ROE). This induces us to formulate the hypothesis about the change in E(ROE) between the two years for our sample (*Hypothesis II*);

$$H_0: \text{implied E(ROE) 2009} \geq \text{implied E(ROE) 2007}$$

$$H_1: \text{implied E(ROE) 2009} < \text{implied E(ROE) 2007}$$

For 2009, when the market prices reached historically low levels, our hypothesis is that the historical ROE exceeds the implied E(ROE), hence the hypothesis (*Hypothesis III*),

$$H_0: \text{historical ROE} \leq \text{implied E(ROE)}$$

$$H_1: \text{historical ROE} > \text{implied E(ROE)}$$

By formulating the H_1 hypothesis as the difference we want to test for, we can reject the H_0 hypothesis and draw the conclusion that there is a significant difference only if we have strong enough evidence. If we fail to reject the H_0 hypothesis this can mean either that it is in fact true that there is no positive/negative difference or that the test wasn't powerful enough to prove the opposite.

Often a significance level between 1 and 10 % is chosen for a test, hence stating that if the p-value exceeds this critical value the H_0 can not be rejected. Instead of defining a significance level on which we want to test our hypothesis we observe the received P-value and aim to draw conclusions from this. A low p-value represents a test result that can be considered statistically significant.

4.2.2. Hypothesis I - Implied E(ROE) 2007 vs. Historical ROE

Below are the main results for hypothesis I:

Mean	Var	Std	Z	P-value
1105,5	24505,25	156,541528	-5,3564061	0,0000000424

Table 6.Result from WRST for hypothesis I

The results show that we can reject H_0 on all reasonable significance levels. Hence, the results strongly support that the implied E(ROE)s needed to reach the stock prices present in 2007 are higher than the historical average ROEs. Conditioned that the historical ROE represents a measure of reasonable expectations, the investors seem to base their actions on something else than what would be considered a reasonable fundamental value.

This result indicates that investors have expectations on the companies' future ROE that is unreasonably high compared to a historical average. As stated in the introduction the theory of market sentiment may shed some light on why the difference in ROE's occurs. Given the herding behavior inherent in this theory the unreasonably high expectations could be described as a result of the overall bullish market setting present in 2007. It seems that, due to this somewhat "bubble-like" setting, stock prices are pushed beyond the point where they are based on reasonable expectations of ROE. The result suggests that it is the expectations of the stock price movements themselves rather than the E(ROE) that steer the prices to these levels.

Another possible explanation for this result can be found in the information priced into the prevailing stock prices. We assume that historical ROE measures are to be considered as reasonable expectations for the future, and hence that these measures would contain all information needed to derive the fundamental price level. Though, a reasoning that clearly contradicts this result is that rational investors can be assumed to price in either more or less information than this.⁴¹ In case it is not only the information in the financial statements provided by the companies, and hence the historical ROE performance, that is priced in, an implied E(ROE) larger than the historical ROE would not seem as unreasonable. Put differently, there may be indefinite sources of information accounted for in investors expectations on future ROE,

⁴¹ Malkiel(1999)

which would imply that using only historical ROE might underestimate what the investors consider as reasonable.

4.2.3. Hypothesis II – Implied E(ROE) 2007 vs. Implied E(ROE) 2009

In the test of hypothesis II, the following output was established:

Mean	Var	Std	Z	P-value
1105,5	24505,25	156,541528	-3,439981753	0,000290877

Table 7.Result from WRST for hypothesis II

From these results we can draw some conclusion regarding hypothesis II. The resulting p-value indicates that we can reject the H_0 on a 0,0291% level. We conclude that there is strong statistical support for the H_1 hypothesis, that the implied E(ROE) needed to reach the prices present in 2007 is higher than in 2009.

This test of the implied E(ROE) should be rather expected. All else equal, a decrease in prices will require lower expectations of ROE to satisfy the RIV equation. Hence, seeing the high prices present in 2007, the implied E(ROE) needed would also have to be high in relation to the E(ROE) needed in 2009, due to the substantially lower prices.

However, when breaking down the RIV model one concludes that there are two other main factors that will affect the outcome between the years;

- The change in required rate of return r_E
- The change in P_{fail}

Changes in these values over time will affect the implied ROE expectations, given a specific market price. After having conducted a WRST to test the tendencies in the change of r_E and P_{fail} between 2007 and 2009 we conclude that there is a significant increase in average P_{fail} between the two years, seeing a p-value of 0,000000474%. The resulting p-value in the WRST for the difference in r_E however is 29% and hence we can not conclude there to be any significant change in the required rate of return between 2007 and 2009. The hypotheses and results are defined and presented in appendix VI and VII.

From the calculations of the probability of failure, we conclude that the interest expense ratio and the solidity ratio is the two ratios with largest impact on the outcome of the final p-fail measure. Thus, as we see an average decrease in the companies solidity of about 10% between the two

dates of valuation, the increase in p-fail is to be rather expected and as suggested above these changes are relevant in the context of reasonability in the pricing of stocks in 2009.

We conclude that the increase in P-fail will push prices down and enable implied E(ROE) to still stay at levels considered high in comparison with historical levels. As this will affect the levels of implied E(ROE) for 2009 it will be considered in the further analysis of Hypothesis III result below.

4.2.4. Hypothesis III - Implied E(ROE) 2009 vs. Historical ROE

Below are the main results for Hypothesis III:

Mean	Var	Std	Z	P-value
1105,5	24505,25	156,541528	2,80117363	0,997454144

Table 8.Result from WRST for hypothesis III

The 2009 figures show that hypothesis III cannot be statistically supported at any significance level. With a P-value of about 99,8% the results instead imply that the opposite, that the implied E(ROE)s are higher than the historical is statistically supported also for this valuation date. We consider this to be an unexpected result given the extreme plunge in stock prices in the months prior to the valuation date.

The result implies that even during the severe crisis recently experienced investors seem to have valued the companies based on E(ROE)s above what historical averages would suggest as reasonable. Using the same reasoning as in hypothesis I, for the this result, it seems that the bearish market sentiment present in that time has not pushed prices down to a level where the implied E(ROE) would be equal to, or even lower than, what historical ROE would imply.

However, as stated in the analysis of hypothesis II the outline of the RIV model suggests that changes in P_{fail} or r_e can explain the high implied E(ROE). From this reasoning, one possible reason for the persistent high levels of E(ROE)s can be found in the increased values of P_{fail} . An increase in this variable would enable a large drop in the stock prices with implied E(ROE)s remaining at high levels compared to historical ROEs. This leads to an intriguing conclusion;

- It appears to be the case that it is the financial stability within companies that has been altered, and hence have affected stock prices.

This fact seems rather reasonable considering the financial nature of the crisis. The result hence suggest that the underlying reason for the crisis had a large impact on the prices through the increase of the P_{fail} , while the expectations on the operating ability in the companies still are high in comparison to historical performance.

4.3. Validity of the Results

4.3.1. Model Assumptions

Valuation models used in the financial markets today are practically all based on simplifications and assumption that seldom apply to the real world. The CAPM, for example has been widely criticized as a model for estimating cost of equity.⁴² This should however not have any implications on the results we reach in this thesis since we are not trying to come up with fair valuations of the companies but rather replicate the valuations made by investors. Therefore, using a model like the CAPM should be fully reasonable considering it actually is the most commonly used model for estimating cost of equity on the financial market.

An argument often used when criticizing the RIV model is that it relies on accounting data as input, which can easily be manipulated by the information providers. We do not believe this will distort our model since, manipulated or not, the information we receive from the annual reports is the same information as the market actors receive.

One part of the RIV model which can be subject for discussion is the q value obtained from Runsten's study and the relevance of this 12 year old measure. The fact that the accounting standards have moved towards recognizing assets to market values with the implementation of IFRS would, as previously discussed, suggest that the q should converge towards 0, especially for companies in capital intensive industries. However, adjusting for this would actually increase the terminal value for most companies since the market value tends to be higher than the book value and this would mean a higher implied $E(ROE)$ all other things equal. This adjustment would perhaps provide us with a fairer valuation but it could not help to explain the unreasonably high ROE expectations we have observed.

In the calculation of P_{fail} we receive results for a number of companies that seem high. Although we see that these companies have increased their debt in relation to their equity we have a hard

¹³ Roll (1977); Fama, French (1992, 1993)

time accepting this as the main reason for the high probabilities. One reason could be that the particular model for calculating P_{fail} we are using might not be applicable to some of the companies in the sample, due to the difference in characteristics between these and the companies studied by Skogsvik.⁴³ However, we have made the decision to still include companies with high P_{fail} because since we consider it hard to distinguish between the ones for which the model does not apply, and the ones that actually have very high P_{fail} .

Assumptions that are based on our own estimation of what is reasonable and what the market most likely thinks, could be argued to make the valuation somewhat subjective. This is why we have aimed to make these assumptions as few as possible and in cases where they are needed as reasonable as possible not to affect the valuation too much.

4.3.2. Average Historical ROE as a Measure of Reasonableness

A central question in analyzing the results is, of course, if the measure we use to draw conclusions about the reasonableness of the implied $E(\text{ROE})$ is in fact reasonable. We chose to compare the implied $E(\text{ROE})$ with the average historical ROE over the last ten years since this is the explicit period we aim to forecast and because the findings actually are the average $E(\text{ROE})$ over the ten coming years.

However the ROE levels over the last decade may be disputable as a measure, seeing the strongly volatile economic environment that has prevailed. Many companies on the Stockholm OMX Stock Exchange has experienced years of great profitability during the beginning of the second half of the decade but also suffered losses during crises in the early and late years of the decade. These shifts in profitability may cause the last 10-years average ROE, to differ from the overall historical reasonable level in the companies.

Also, the lifetime of the companies has an affect on how reasonable the last ten years ROEs can be considered to be. In the Large cap most companies are old and it could be argued that these are in a mature phase of their business cycle and hence are experiencing pretty stable returns. On the other side of this spectrum we can however identify many small cap companies as fairly new and still in a start-up phase. Especially relatively small biotech companies such as Biophausia and KaroBio with a large portion of their products still in clinical testing, may have had returns

⁴³ Skogsvik (1987)

during the last ten years that could not be seen as reasonable for a more stabile phase in their business cycle, which they may or may not enter during the coming ten years.

5. Conclusion & Summary

During our investigation and evaluation of the level of implied E(ROE) needed to deduce the stock prices prevailing in 2007 and 2009 we have found some expected and some unexpected results. All results are stated and conceived under the assumptions that stock market prices can be deduced from the RIV model and that historical average ROEs are to be considered as reasonable expectations for the future.

We find statistical support for the test of implied E(ROE) being higher than what historical measures of ROE would indicate as reasonable in 2007, and hence conclude that hypothesis I holds true. In our analysis on why this anomalie might have occurred we argue that the bullish market sentiment present is plausible to have pushed prices to a level where the historical ROE levels are not sufficient to satisfy the fundamental value inherent in the stock prices. This result suggests that it is the expectations of the stock price movements themselves rather than E(ROE) that has steared the prices to these levels.

Another possible explanation for this result can be found in the information priced into the prevailing stock prices. There may be indefinite sources of information accounted for in investors expectations on future ROE, which would imply that using only historical ROE might underestimate what the investors consider as reasonable.

In hypothesis II we have found statistical support that the implied E(ROE)s are higher in 2007 than in 2009. This result is to be rather expected as a lower price requires a lower measure of E(ROE), when holding all other variables constant. Although, we do observe an increase in P_{fail} in our sample companies between the years. This could be part of the explanation to why the implied E(ROE) still stays at levels considered unreasonably high, while the prices are pushed down substantially.

The results does not support hypothesis III, and we conclude that rather than implied E(ROE)s inferior to historical ROEs the opposite seem to hold true in 2009. In the analysis of this somewhat unexpected result we apply the results shown in the comparison between implied E(ROE)s in 2007 and 2009 regarding the effect of an increased P_{fail} on the resulting implied

E(ROE). We conclude that one probable reason for why the implied E(ROE)s are still higher than historical can be found in the nature of the financial crisis. It appears to be the case that it is the financial stability within companies has been altered, and hence have affected stock prices to a greater extent than the expectations of the companies' future ROE. This result suggests that the underlying reason for the crisis had a considerable impact on the prices through the increase of the P_{fail} , while the expectations on the operating ability in the companies still are high in comparison to historical performance.

To sum up we find the resulting implied E(ROE)s inherent in the stock prices present on the Stockholm OMX Stock Exchange as presented in the table under "Results – Implied return on equity 2007 & 2009". The analysis show that in both the bullish and the bearish market setting the measures of implied E(ROE) are above what the historical figures would suggest as reasonable.

6. References

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Interview

Sandberg, Rickard, *Assistant Professor*, Centre for Economic Statistics, Stockholm School of Economics

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Thomson DataStream®

Appendix I - Indata for calculation of Implied ROE 2007

Company	Listing	Industry	Book Value Equity 31-12-06	Proposed dividend 2007	No. Of Shares outstanding 16-04-07	Target/Historical payout ratio	Beta (60 months)
ABB Ltd.	LargeCap	Engineering	5587000000	510720000	2248000000	0,4	1,17
Assa Abloy AB	LargeCap	Engineering	13585000000	1189000000	376033000	0,4	1,28
Alfa Laval AB	LargeCap	Engineering	6712600000	698000000	111671993	0,45	0,80
Astra Zeneca PLC	LargeCap	Pharmaceutical	15304000000	2649000000	1532245608	0,5	0,86
Atlas Copco AB	LargeCap	Engineering	32616000000	2899000000	610392352	0,45	1,70
Boliden AB	LargeCap	Other production	16089000000	1158000000	289457169	0,33	1,61
Electrolux AB	LargeCap	Engineering	13193000000	2222000000	299418033	0,3	1,00
LM Ericsson Tele	LargeCap	Capital intensive services	120113000000	8066129000	16132258878	0,4	1,27
Gefinge AB	LargeCap	Other production	5983300000	4441000000	201873920	0,35	0,87
Lundin Petroleum AB	LargeCap	Other production	57890844010	0	313907580	0,1	0,03
Modern Times GRP MTG	LargeCap	Other services	4984200000	502463000	67042524	0,3	1,72
Scania AB	LargeCap	Engineering	26129000000	750000000	200000000	0,5	1,21
SKF AB	LargeCap	Engineering	18973000000	2049079806	455351068	0,5	1,00
SSAB Svenskt Stål AB	LargeCap	Other production	15335000000	1166165195	259147821	0,5	0,58
Sandvik AB	LargeCap	Engineering	26146000000	3854500000	1186000000	0,5	0,71
Securitas AB	LargeCap	Other services	9602700000	1131682581	365058897	0,45	1,31
Skanska AB	LargeCap	Building and construction	19190000000	3490187844	423053072	0,6	1,49
Svenska Cellulosa AB	LargeCap	Pulp and paper	58299000000	1880293584	470073396	0,5	0,58
Swedish Match AB	LargeCap	Consumer goods	2287000000	700000000	280000000	0,5	-0,02
Tele2 AB	LargeCap	Capital intensive services	28800000000	813415955,2	444489593	0,5	1,25
Telia Sonera AB	LargeCap	Capital intensive services	119217000000	20207057459	4490457213	0,5	1,00
Volvo AB	LargeCap	Engineering	86904000000	10119964750	404798590	0,5	1,15
Eniro AB	MidCap	Other services	5120000000	801250000	182102392	0,5	1,04
Sas AB	MidCap	Other services	16366000000	0	164500000	0,35	1,65
PA Resources AB	MidCap	Other production	2312477000	0	145014004	0	1,26
Kungsleden AB	MidCap	Real estate	9700200000	1501500000	136502064	0,6	0,78
JM AB	MidCap	Building and construction	3590000000	415300000	92289764	0,5	1,04
Net Insight AB	MidCap	Other production	136796000	0	367757010	0,1	2,62
PEAB AB	MidCap	Building and construction	3277000000	878700000	87195944	0,6	0,55
Intrum Justitia AB	MidCap	Other services	1459800000	214380000	77956251	0,6	0,62
Billerud AB	MidCap	Pulp and paper	2678000000	186480000	51369620	0,5	0,75
Nobia AB	MidCap	Consumer goods	3727000000	347000000	57850220	0,4	0,93
New Wave Group AB	MidCap	Consumer goods	1300700000	657000000	66344000	0,3	0,85
Gunnabo AB	MidCap	Capital intensive services	1043800000	71300000	45156282	0,35	0,73
Haldex AB	MidCap	Engineering	1894000000	99300000	22296220	0,4	0,92
Betsson AB	MidCap	Other services	490928000	19776800	39553720	0,6	1,91
Axis AB	MidCap	Engineering	501069000	207759000	69253000	0,33	1,06
Q-Med AB	MidCap	Pharmaceutical	1247951000	198698600	99349329	0,7	1,55
Klövern AB	MidCap	Real estate	3868239000	208180400	166544326	0,5	1,08
Neonet	MidCap	Other services	328771000	24600000	61467107	0,6	1,31
Munters AB	MidCap	Engineering	1500000000	168750000	24594750,07	0,5	0,49
Bioinvent Intl.	MidCap	Pharmaceutical	110152000	0	47161000	0,2	1,51
Active Biotech AB	MidCap	Pharmaceutical	60358000	0	40000000	0,1	1,52
Precise Biometrics	SmallCap	Other production	95016000	0	97220600	0,1	0,13
Rottneros AB	SmallCap	Pulp and paper	1403000000	43000	188432105	0,4	1,02
Pricer AB	SmallCap	Other production	353106000	0	1016132200	0,1	0,75
Karo Bio AB	SmallCap	Pharmaceutical	210503000	0	77412795	0,2	2,40
Tricorona	SmallCap	Congl. and mix. Inv.	357736000	0	137876845	0,5	-0,12
Fingerprint Cards AB	SmallCap	Other production	100934088	0	11122434	0	2,13
Biotage AB	SmallCap	Chemical industry	712474000	0	88486320	0,5	2,21
Sensys Traffic AB	SmallCap	Other production	127594550	0	215927051	0,4	1,28
Artimplant	SmallCap	Other production	77967000	0	59244790	0,1	2,65
Biophausia AB	SmallCap	Pharmaceutical	182441000	0	113792673	0,1	0,63
Cision AB	SmallCap	Other services	1249082000	0	74453572	0,25	1,79
Modul 1 Data AB	SmallCap	Consultant and Computer	50734000	0	93452446	0,6	0,54
Acando AB	SmallCap	Consultant and Computer	622974000	0	76643668	0,4	1,95
Anoto Group AB	SmallCap	Other production	458237000	0	128583867	0,3	1,59
Mobyson AB	SmallCap	Other production	42200000	0	169601365	0,1	0,75
Aspiro AB	SmallCap	Other services	488560000	0	190538115	0,2	0,59
Micronic Laser System	SmallCap	Engineering	1109846000	0	39166616	0,1	2,40
Proffice AB	SmallCap	Other services	324000000	0	68768651	0,5	1,81
Rederi AB Trans.	SmallCap	Shipping	1060181000	56861000	30857654	0,33	0,73
Sigma AB	SmallCap	Consultant and Computer	368338000	24091100	86042499	0,4	0,96
Vitrolife AB	SmallCap	Pharmaceutical	220639000	0	19790157	0,3	1,29
Know It AB	SmallCap	Consultant and Computer	241256000	27508300	11544214	0,4	1,12
Raysearch Lab	SmallCap	Other production	118073000	0	11427591	0,2	0,58

Indata for calculation of Implied ROE 2007 cont.

Company	Rf	Rm	Re	Pfail 1 year	Pfail 2 years	Pfail 3 years	Pfail 4 years	Pfail 5 years	Pfail 6 years and on
ABB Ltd.	4,78%	4,42%	9,95%	0,2401%	0,7713%	1,3719%	1,6021%	1,4788%	1,7686%
Assa Abloy AB	4,78%	4,42%	10,45%	0,0902%	0,5753%	1,0897%	2,1809%	2,5179%	2,6159%
Alfa Laval AB	4,78%	4,42%	8,30%	0,0671%	0,3772%	1,2404%	2,2778%	2,5774%	2,7365%
Astra Zeneca PLC	4,78%	4,42%	8,56%	0,0005%	0,0193%	0,1645%	0,3429%	0,3281%	1,2247%
Atlas Copco AB	4,78%	4,42%	12,30%	0,0017%	0,0452%	0,0574%	0,1332%	0,1257%	0,9120%
Boliden AB	4,78%	4,42%	11,91%	0,0000%	0,0028%	0,0681%	0,1770%	0,2661%	0,6328%
Electrolux AB	4,78%	4,42%	9,18%	0,2756%	1,2046%	1,9945%	2,4952%	2,4006%	2,1640%
LM Ericsson Tele	4,78%	4,42%	10,39%	0,0004%	0,0266%	0,0843%	0,2202%	0,3480%	0,5875%
Getinge AB	4,78%	4,42%	8,61%	0,0417%	0,3256%	0,5512%	1,3736%	1,6021%	1,8193%
Lundin Petroleum AB	4,78%	4,42%	4,93%	0,0007%	0,0209%	0,1113%	0,2069%	0,3766%	0,4851%
Modern Times GRP MTG	4,78%	4,42%	12,38%	0,0001%	0,0149%	0,1159%	0,3611%	0,6334%	0,7000%
Scania AB	4,78%	4,42%	10,11%	0,0330%	0,3163%	0,6294%	0,8314%	0,9509%	0,9211%
SKF AB	4,78%	4,42%	9,21%	0,0082%	0,1294%	0,2461%	0,3370%	0,3680%	0,8180%
SSAB Svenskt Stål AB	4,78%	4,42%	7,33%	0,0000%	0,0020%	0,0305%	0,1070%	0,2403%	0,4210%
Sandvik AB	4,78%	4,42%	7,90%	0,6976%	0,7659%	5,2561%	5,1496%	7,2366%	8,0164%
Securitas AB	4,78%	4,42%	10,59%	0,3673%	1,5866%	1,5849%	3,2046%	3,0819%	2,9667%
Skanska AB	4,78%	4,42%	11,35%	0,0440%	0,4546%	0,6306%	1,0004%	1,0881%	0,9119%
Svenska Cellulosa AB	4,78%	4,42%	7,37%	0,0292%	0,3462%	0,4921%	1,2341%	1,6866%	1,5684%
Swedish Match AB	4,78%	4,42%	4,68%	0,1822%	0,7347%	1,9121%	1,7379%	1,1276%	2,1828%
Tele2 AB	4,78%	4,42%	10,32%	0,0396%	0,5771%	0,2325%	0,7893%	1,0500%	1,0523%
Telia Sonera AB	4,78%	4,42%	9,18%	0,0001%	0,0154%	0,0190%	0,0859%	0,1646%	0,2955%
Volvo AB	4,78%	4,42%	9,85%	0,0276%	0,3093%	0,5698%	0,9844%	1,2796%	1,0066%
Eniro AB	4,78%	4,42%	9,38%	0,2813%	1,0870%	1,7190%	3,1030%	2,8803%	3,1295%
Sas AB	4,78%	4,42%	12,06%	0,3430%	1,2855%	0,6868%	1,0527%	0,8506%	1,7197%
PA Resources AB	4,78%	4,42%	10,34%	0,8127%	1,3671%	1,4452%	3,7053%	2,9048%	8,0389%
Kungsleden AB	4,78%	4,42%	8,21%	0,0244%	0,2302%	0,5978%	1,7865%	2,0541%	2,1140%
JM AB	4,78%	4,42%	9,38%	0,0006%	0,0340%	0,1274%	0,2684%	0,2958%	0,5629%
Net Insight AB	4,78%	4,42%	16,35%	0,0004%	0,0631%	0,0002%	0,0001%	0,0001%	0,0197%
PEAB AB	4,78%	4,42%	7,22%	0,1166%	0,7062%	1,5816%	2,0811%	2,0632%	1,5436%
Intrum Justitia AB	4,78%	4,42%	7,50%	0,0333%	0,3218%	0,6736%	1,4340%	1,5117%	1,6097%
Billerud AB	4,78%	4,42%	8,11%	0,0647%	0,5505%	0,7230%	1,1892%	1,2566%	1,3416%
Nobia AB	4,78%	4,42%	8,87%	0,0191%	0,2141%	0,6798%	1,4523%	1,7555%	1,7344%
New Wave Group AB	4,78%	4,42%	8,52%	0,2849%	0,7843%	1,9328%	2,7423%	3,2850%	3,7396%
Gunnabo AB	4,78%	4,42%	7,99%	0,9726%	2,6271%	1,8099%	3,3544%	3,2541%	2,9055%
Haldex AB	4,78%	4,42%	8,85%	0,0362%	0,3734%	0,3667%	1,0339%	1,2573%	1,4169%
Betsson AB	4,78%	4,42%	13,20%	0,0000%	0,0059%	0,0013%	0,0161%	0,0374%	0,1842%
Axis AB	4,78%	4,42%	9,48%	0,0000%	0,0006%	0,0061%	0,0095%	0,0144%	0,1020%
Q-Med AB	4,78%	4,42%	11,61%	0,0000%	0,0008%	0,0001%	0,0000%	0,0000%	0,0111%
Klövern AB	4,78%	4,42%	9,59%	0,1162%	0,5873%	0,6098%	1,5862%	1,6560%	1,8230%
Neonet	4,78%	4,42%	10,55%	0,2561%	0,9055%	1,7542%	5,3937%	5,6391%	7,5087%
Munters AB	4,78%	4,42%	6,96%	0,0006%	0,0393%	0,1795%	0,4646%	0,7259%	0,6899%
Bioinvent Intl.	4,78%	4,42%	11,44%	0,1128%	2,9792%	0,0001%	0,0003%	0,0004%	0,0183%
Active Biotech AB	4,78%	4,42%	11,50%	17,8939%	23,6750%	3,0438%	4,0093%	2,4340%	4,4983%
Precise Biometrics	4,78%	4,42%	5,38%	4,6424%	18,3087%	0,0003%	0,0003%	0,0002%	0,0518%
Rottneros AB	4,78%	4,42%	9,29%	0,0097%	0,2409%	0,3262%	0,4658%	0,8054%	0,9362%
Pricer AB	4,78%	4,42%	8,08%	0,0379%	0,4286%	0,0301%	0,2365%	0,4728%	0,7953%
Karo Bio AB	4,78%	4,42%	15,38%	0,0048%	0,6317%	0,0000%	0,0000%	0,0000%	0,0046%
Tricorona	4,78%	4,42%	4,25%	0,0023%	0,0522%	0,0015%	0,0017%	0,0023%	0,0851%
Fingerprint Cards AB	4,78%	4,42%	14,17%	0,0291%	0,3010%	0,0000%	0,0000%	0,0000%	0,0018%
Biotage AB	4,78%	4,42%	14,53%	0,0004%	0,0516%	0,0203%	0,0987%	0,2364%	0,5115%
Sensys Traffic AB	4,78%	4,42%	10,45%	0,0000%	0,0000%	0,0000%	0,0000%	0,0000%	0,0001%
Artimplant	4,78%	4,42%	16,49%	0,0098%	0,9525%	0,0000%	0,0000%	0,0000%	0,0000%
Biophausia AB	4,78%	4,42%	7,56%	0,7838%	1,3608%	0,3518%	4,2945%	4,5956%	4,9328%
Cision AB	4,78%	4,42%	12,68%	0,6828%	3,5562%	0,2808%	0,9319%	1,0287%	1,5965%
Modul 1 Data AB	4,78%	4,42%	7,18%	0,0214%	0,2408%	0,0000%	0,3684%	0,4807%	0,6368%
Acando AB	4,78%	4,42%	13,40%	0,0000%	0,0060%	0,0041%	0,0267%	0,0613%	0,1354%
Anoto Group AB	4,78%	4,42%	11,78%	0,0003%	0,1089%	0,0002%	0,0009%	0,0022%	0,0263%
Mobyson AB	4,78%	4,42%	8,09%	1,1484%	3,3702%	0,8933%	1,9841%	1,9549%	1,6696%
Aspiro AB	4,78%	4,42%	7,37%	0,0000%	0,0040%	0,0000%	0,0026%	0,0084%	0,0386%
Micronic Laser System	4,78%	4,42%	15,38%	0,0001%	0,0266%	0,0007%	0,0005%	0,0003%	0,0352%
Proffice AB	4,78%	4,42%	12,79%	0,1025%	0,6939%	0,7298%	1,2248%	1,3261%	1,1532%
Rederi AB Trans.	4,78%	4,42%	8,00%	0,0520%	0,4731%	0,3425%	0,7884%	0,7325%	1,4672%
Sigma AB	4,78%	4,42%	9,03%	0,0012%	0,0562%	0,2162%	0,7347%	1,1460%	1,0682%
Vitrolife AB	4,78%	4,42%	10,49%	0,9502%	1,8596%	0,8926%	5,7812%	5,6411%	20,2552%
Know It AB	4,78%	4,42%	9,71%	0,0003%	0,0277%	0,0790%	0,1953%	0,2928%	0,3698%
Raysearch Lab	4,78%	4,42%	7,33%	0,0000%	0,0001%	0,0000%	0,0000%	0,0000%	0,0000%

Indata for calculation of Implied ROE 2007 cont.

Company	Runstens Q	Average Historical ROE 97-06	Market value 16-04-2007
ABB Ltd.	0,33	15,73%	2,69715E+11
Assa Abloy AB	0,33	15,57%	60729329500
Alfa Laval AB	0,33	13,31%	11320189926
Astra Zeneca PLC	1,74	30,20%	5,93745E+11
Atlas Copco AB	0,33	16,59%	61991447269
Boliden AB	0,31	5,22%	44475094017
Electrolux AB	0,33	15,96%	55092918072
LM Ericsson Tele	0,96	25,18%	2,16172E+12
Getinge AB	0,31	27,83%	31128958464
Lundin Petroleum AB	0,31	33,40%	20906244828
Modern Times GRP MTG	0,62	16,03%	28258423866
Scania AB	0,33	22,13%	26430000000
SKF AB	0,33	15,57%	61950512801
SSAB Svenskt Stål AB	0,31	10,17%	53946801898
Sandvik AB	0,33	17,36%	148582080000
Securitas AB	0,62	12,77%	33067034890
Skanska AB	0,38	19,56%	63669487336
Svenska Cellulosa AB	0,67	12,21%	60014270467
Swedish Match AB	0,72	39,74%	34580000000
Tele2 AB	0,96	2,36%	52227527178
Telia Sonera AB	0,96	11,53%	295247561755
Volvo AB	0,33	13,61%	46705661314
Eniro AB	0,62	17,65%	26510466227
Sas AB	0,62	-3,46%	1654870000
PA Resources AB	0,31	23,30%	8815401303
Kungsliden AB	0,56	28,16%	16347487185
JM AB	0,38	15,29%	22576844967
Net Insight AB	0,31	8,97%	2555911220
PEAB AB	0,38	19,86%	6277236009
Intrum Justitia AB	0,62	16,15%	7620223535
Billerud AB	0,67	16,04%	3806488842
Nobia AB	0,72	22,97%	5823781647
New Wave Group AB	0,72	23,77%	5705584000
Gunnabo AB	0,96	14,79%	2526042415
Haldex AB	0,33	13,44%	2414234702
Betsson AB	0,62	6,78%	1149826640
Axis AB	0,33	12,43%	8587372000
Q-Med AB	1,74	19,09%	11276148842
Klövern AB	0,56	18,91%	5212837404
Neonet	0,62	-2,99%	1509632148
Munters AB	0,33	26,37%	2389379970
Bioinvent Intl.	1,74	-40,02%	900775100
Active Biotech AB	1,74	-41,71%	2758800000
Precise Biometrics	0,31	-80,48%	291661800
Rottneros AB	0,67	4,04%	278879515,4
Pricer AB	0,31	-22,26%	569034032
Karo Bio AB	1,74	-44,24%	1208413730
Tricorona	0,28	-3,48%	646642403,1
Fingerprint Cards AB	0,31	-28,68%	217109911,7
Biotage AB	0,44	-20,16%	1123776264
Sensys Traffic AB	0,31	-46,98%	991105164,1
Artimplant	0,31	-37,78%	370279937,5
Biophausia AB	1,74	2,00%	586032266
Cision AB	0,62	3,36%	1678928049
Modul 1 Data AB	0,59	-29,26%	120553655,3
Acando AB	0,59	3,27%	1231663745
Anoto Group AB	0,31	-50,62%	1575152371
Mobyson AB	0,31	-66,26%	278146238,6
Aspiro AB	0,62	7,93%	539222865,5
Micronic Laser System	0,33	5,05%	1904672536
Proffice AB	0,62	6,44%	1691708815
Rederi AB Trans.	0,65	2,48%	1735743038
Sigma AB	0,59	-3,77%	1032509988
Vitrolife AB	1,74	-4,63%	714424667,7
Know It AB	0,59	12,58%	721513375
Raysearch Lab	0,31	44,95%	693311946

Appendix II - Indata for calculation of Implied ROE 2009

Company	Listing	Industry	Book Value Equity 31-12-08	Proposed dividend 2009	No. Of Shares outstanding 16-04- 09	Target/Historical payout ratio	Beta (60 months)
ABB Ltd.	LargeCap	Engineering	10546000000	1028940000	2282684821	0,4	1,47
Assa Abloy AB	LargeCap	Engineering	18675000000	1317000000	380713000	0,4	1,10
Alfa Laval AB	LargeCap	Engineering	10378000000	950000000	422039466,2	0,45	1,42
Astra Zeneca PLC	LargeCap	Pharmaceutical	15912000000	2767000000	1447481548	0,5	0,51
Atlas Copco AB	LargeCap	Engineering	23627000000	3648000000	1215909704	0,45	1,32
Boliden AB	LargeCap	Other production	16131000000	274000000	273511169	0,33	1,50
Electrolux AB	LargeCap	Engineering	16385000000	0	283581504	0,3	1,11
LM Ericsson Tele	LargeCap	Capital intensive services	140823000000	5923700000	3246351735	0,4	1,12
Getinge AB	LargeCap	Other production	10652000000	514800000	214491040	0,35	1,00
Lundin Petroleum AB	LargeCap	Other production	81862534950	0	317910580	0,1	0,70
Modern Times GRP MTG	LargeCap	Other services	8662000000	329450000	65890375	0,3	1,48
Scania AB	LargeCap	Engineering	21937000000	2000000000	800000000	0,5	1,61
SKF AB	LargeCap	Engineering	19659000000	1593728738	455351068	0,5	1,10
SSAB Svenskt Stål AB	LargeCap	Other production	34994000000	1295739100	323934775	0,5	1,46
Sandvik AB	LargeCap	Engineering	24817000000	3735900000	1186000000	0,5	1,31
Securitas AB	LargeCap	Other services	8500600000	1058670801	365058897	0,45	0,78
Skanska AB	LargeCap	Building and construction	19071000000	2221028628	423053072	0,6	1,13
Svenska Cellulosa AB	LargeCap	Pulp and paper	66450000000	1645256886	470073396	0,5	0,75
Swedish Match AB	LargeCap	Consumer goods	1377000000	1045500000	255000000	0,5	0,49
Tele2 AB	LargeCap	Capital intensive services	28151000000	2201756695	440351339	0,5	0,97
Telia Sonera AB	LargeCap	Capital intensive services	130387000000	8082822983	4490457213	0,5	0,89
Volvo AB	LargeCap	Engineering	84010000000	4054764006	2027382003	0,5	1,71
Eniro AB	MidCap	Other services	2197000000	0	162271368	0,5	1,66
Sas AB	MidCap	Other services	17130000000	0	164500000	0,35	1,60
PA Resources AB	MidCap	Other production	4756727000	0	146014004	0	2,30
Kungsleden AB	MidCap	Real estate	7064800000	204750000	136502064	0,6	1,61
JM AB	MidCap	Building and construction	3241000000	888800000	83216883	0,5	1,57
Net Insight AB	MidCap	Other production	274474000	0	379890569	0,1	0,70
PEAB AB	MidCap	Building and construction	6370000000	654800000	296 049 730	0,6	1,48
Intrum Justitia AB	MidCap	Other services	2395200000	278570000	79744651	0,6	0,50
Billerud AB	MidCap	Pulp and paper	2638000000	0	53343043	0,5	1,12
Nobia AB	MidCap	Consumer goods	4189000000	219100000	167131157,6	0,4	1,29
New Wave Group AB	MidCap	Consumer goods	1807200000	11900000	66344444	0,3	1,19
Gunnebo AB	MidCap	Capital intensive services	1072900000	0	45513359	0,35	0,96
Haldex AB	MidCap	Engineering	1805000000	0	21920000	0,4	1,97
Betsson AB	MidCap	Other services	490928000	200100000	39553720	0,6	1,14
Axis AB	MidCap	Engineering	441100000	312181600	69373700	0,33	1,58
Q-Med AB	MidCap	Pharmaceutical	1279641000	0	99382000	0,7	1,22
Klövern AB	MidCap	Real estate	4035201000	832722000	160802863	0,5	1,46
Neonet	MidCap	Other services	313879000	0	65066000	0,6	1,06
Munters AB	MidCap	Engineering	1195000000	0	75000000	0,5	0,76
Bioinvent Intl.	MidCap	Pharmaceutical	231298000	0	55661000	0,2	0,95
Active Biotech AB	MidCap	Pharmaceutical	163610000	0	51241791	0,1	0,47
Precise Biometrics	SmallCap	Other production	16004000	0	101220600	0,1	0,53
Rottneros AB	SmallCap	Pulp and paper	810000000	0	188432105	0,4	1,24
Pricer AB	SmallCap	Other production	509875000	0	1016132200	0,1	0,38
Karo Bio AB	SmallCap	Pharmaceutical	219474000	0	116119192	0,2	1,60
Tricorona	SmallCap	Congl. and mix. Inv.	515200000	100382100	143403043	0,5	1,64
Fingerprint Cards AB	SmallCap	Other production	58139000	0	12152733	0	0,94
Biotage AB	SmallCap	Chemical industry	1124793000	17697264	88486320	0,5	0,49
Sensys Traffic AB	SmallCap	Other production	145877855	10800000	215927051	0,4	0,93
Artimplant	SmallCap	Other production	41985000	0	59244790	0,1	1,33
Biophausia AB	SmallCap	Pharmaceutical	534437000	0	342475932	0,1	0,74
Cision AB	SmallCap	Other services	1090385000	0	74544418	0,25	1,73
Modul 1 Data AB	SmallCap	Consultant and Computer	64225000	0	93452446	0,6	0,48
Acando AB	SmallCap	Consultant and Computer	737752000	38584600	77169307	0,4	1,10
Anoto Group AB	SmallCap	Other production	488474000	0	128583867	0,3	1,38
Mobyson AB	SmallCap	Other production	152825000	0	188070115	0,1	0,25
Aspiro AB	SmallCap	Other services	292807000	0	190538115	0,2	0,75
Micronic Laser System	SmallCap	Engineering	888576000	0	39166616	0,1	1,36
Proffice AB	SmallCap	Other services	495000000	0	69723773	0,5	1,32
Rederi AB Trans.	SmallCap	Shipping	1391875000	69800000	28430474	0,33	1,27
Sigma AB	SmallCap	Consultant and Computer	368802000	15086900	86746471	0,4	0,90
Vitrolife AB	SmallCap	Pharmaceutical	292061000	7821100	19800157	0,3	1,13
Know It AB	SmallCap	Consultant and Computer	447181000	31560800	14027018	0,4	1,65
Raysearch Lab	SmallCap	Other production	150435000	0	34282773	0,2	0,89

Indata for calculation of Implied ROE 2009 cont.

Company	Rf	Rm	Re	Pfail 1 year	Pfail 2 years	Pfail 3 years	Pfail 4 years	Pfail 5 years	Pfail 6 years and on
ABB Ltd.	4,46%	4,42%	10,94%	0,05966%	0,55380%	1,07061%	1,50990%	1,49325%	2,42357%
Assa Abloy AB	4,46%	4,42%	9,31%	0,13232%	0,89155%	1,69417%	3,66046%	4,39625%	4,86178%
Alfa Laval AB	4,46%	4,42%	10,74%	0,18526%	0,69349%	4,03851%	7,35714%	7,59896%	9,17357%
Astra Zeneca PLC	4,46%	4,42%	6,70%	0,18382%	0,77590%	3,60726%	7,15432%	6,11198%	9,67224%
Atlas Copco AB	4,46%	4,42%	10,28%	1,55089%	2,07893%	8,33532%	14,84413%	12,67566%	18,86212%
Boliden AB	4,46%	4,42%	11,07%	0,03385%	0,51214%	0,50965%	0,99124%	1,49189%	2,10941%
Electrolux AB	4,46%	4,42%	9,37%	0,99695%	3,35489%	2,56561%	4,30732%	4,20735%	3,94201%
LM Ericsson Tele	4,46%	4,42%	9,41%	0,02885%	0,50597%	0,38735%	0,96804%	1,31318%	1,97870%
Gefinge AB	4,46%	4,42%	8,89%	1,03243%	2,31904%	3,60570%	6,25015%	6,08864%	7,71869%
Lundin Petroleum AB	4,46%	4,42%	7,55%	1,46309%	3,64523%	6,22168%	10,66917%	10,05916%	17,62034%
Modern Times GRP MTG	4,46%	4,42%	11,00%	0,00420%	0,08604%	0,77242%	1,92833%	2,57453%	3,02575%
Scania AB	4,46%	4,42%	11,59%	0,34162%	1,52227%	4,12729%	5,47982%	5,55262%	4,39894%
SKF AB	4,46%	4,42%	9,32%	3,14713%	4,14246%	10,50885%	19,23260%	16,69407%	25,68445%
SSAB Svenskt Stål AB	4,46%	4,42%	10,92%	0,01603%	0,26015%	0,47638%	1,05560%	1,51805%	2,29956%
Sandvik AB	4,46%	4,42%	10,23%	24,37140%	11,83873%	34,89668%	24,62703%	28,14749%	31,42985%
Securitas AB	4,46%	4,42%	7,92%	0,62057%	2,35685%	3,54147%	6,16755%	5,41559%	5,96210%
Skanska AB	4,46%	4,42%	9,47%	0,17663%	1,41687%	1,54544%	2,65915%	2,77354%	2,15600%
Svenska Cellulosa AB	4,46%	4,42%	7,78%	0,15265%	1,12866%	1,05250%	2,77158%	3,38468%	3,98274%
Swedish Match AB	4,46%	4,42%	6,64%	4,15140%	4,34250%	8,28860%	7,91986%	4,81825%	8,49343%
Tele2 AB	4,46%	4,42%	8,77%	0,06963%	0,82929%	0,39773%	3,41933%	4,47871%	6,32956%
Telia Sonera AB	4,46%	4,42%	8,39%	0,00775%	0,23346%	0,31585%	1,12658%	1,50231%	2,32191%
Volvo AB	4,46%	4,42%	12,03%	0,57894%	2,31227%	0,80426%	0,44418%	0,24478%	1,24907%
Eniro AB	4,46%	4,42%	11,78%	6,46887%	11,05188%	12,04233%	15,65982%	12,44471%	12,51044%
Sas AB	4,46%	4,42%	11,55%	4,92145%	11,96603%	2,72799%	3,62967%	2,68477%	4,18442%
PA Resources AB	4,46%	4,42%	14,62%	0,42156%	1,54055%	3,70786%	9,77442%	10,17983%	12,57476%
Kungsleden AB	4,46%	4,42%	11,57%	2,97206%	7,19940%	4,20673%	6,92754%	5,64186%	7,16984%
JM AB	4,46%	4,42%	11,41%	0,05612%	0,71019%	1,44019%	2,16444%	2,25281%	2,49938%
Net Insight AB	4,46%	4,42%	7,56%	0,00004%	0,00978%	0,00003%	0,00000%	0,00000%	0,02418%
PEAB AB	4,46%	4,42%	11,02%	0,64245%	1,99275%	2,06236%	4,45477%	4,72039%	3,87266%
Intrum Justitia AB	4,46%	4,42%	6,69%	0,21181%	1,18854%	1,82939%	4,22851%	4,22995%	5,11644%
Billerud AB	4,46%	4,42%	9,41%	0,88523%	3,12652%	1,59030%	4,60890%	4,53677%	5,18034%
Nobia AB	4,46%	4,42%	10,14%	0,18936%	1,22272%	1,94197%	4,18803%	4,64268%	4,64268%
New Wave Group AB	4,46%	4,42%	9,74%	2,78176%	4,03832%	6,77435%	8,16187%	8,29339%	11,53210%
Gunnebo AB	4,46%	4,42%	8,72%	1,46506%	3,91158%	4,15247%	7,75302%	7,42009%	6,47965%
Haldex AB	4,46%	4,42%	13,17%	1,39781%	4,12577%	4,57873%	5,92452%	5,88685%	6,21314%
Betsson AB	4,46%	4,42%	9,51%	0,00000%	0,00174%	0,00843%	0,02811%	0,04933%	0,18669%
Axis AB	4,46%	4,42%	11,45%	0,00000%	0,00209%	0,11371%	0,23924%	0,37187%	0,64364%
Q-Med AB	4,46%	4,42%	9,84%	0,00010%	0,03892%	0,00843%	0,02563%	0,05762%	0,28007%
Klövern AB	4,46%	4,42%	10,89%	1,23706%	4,58540%	2,00246%	5,71324%	5,62775%	6,09780%
Neonet	4,46%	4,42%	9,13%	0,18825%	1,54192%	1,83422%	4,64660%	5,31427%	4,88378%
Munters AB	4,46%	4,42%	7,82%	0,44730%	2,02427%	2,59950%	3,68396%	3,36053%	4,08157%
Bioinvent Intl.	4,46%	4,42%	8,67%	0,00000%	0,00889%	0,00122%	0,00863%	0,02516%	0,10213%
Active Biotech AB	4,46%	4,42%	6,54%	12,28204%	25,31845%	0,06991%	0,03015%	0,00617%	0,57260%
Precise Biometrics	4,46%	4,42%	6,79%	58,23945%	81,87462%	0,21508%	0,53043%	0,61667%	1,31403%
Rottneros AB	4,46%	4,42%	9,94%	3,06602%	8,66359%	2,02522%	4,79341%	5,63740%	5,96968%
Pricer AB	4,46%	4,42%	6,13%	0,00172%	0,08944%	0,02315%	0,24595%	0,37379%	1,90889%
Karo Bio AB	4,46%	4,42%	11,53%	0,03928%	2,82175%	0,00001%	0,00002%	0,00002%	0,00966%
Tricorona	4,46%	4,42%	11,69%	0,00000%	0,00023%	0,00262%	0,00571%	0,00843%	0,10724%
Fingerprint Cards AB	4,46%	4,42%	8,62%	0,08581%	1,60331%	0,00094%	0,00047%	0,00085%	0,10185%
Biotage AB	4,46%	4,42%	6,61%	0,00000%	0,00065%	0,00012%	0,00013%	0,00013%	0,05472%
Sensys Traffic AB	4,46%	4,42%	8,56%	0,01136%	0,18142%	0,58270%	0,91026%	1,51240%	1,81331%
Artimplant	4,46%	4,42%	10,33%	0,02427%	1,36180%	0,00000%	0,00000%	0,00000%	0,00002%
Biophausia AB	4,46%	4,42%	7,73%	3,43439%	4,15759%	1,66115%	11,97257%	12,59669%	16,51095%
Cision AB	4,46%	4,42%	12,08%	0,53187%	3,28329%	0,57238%	1,88432%	1,93960%	2,96350%
Modul 1 Data AB	4,46%	4,42%	6,60%	0,01875%	0,41863%	0,46809%	2,21854%	3,19068%	5,42166%
Acando AB	4,46%	4,42%	9,30%	0,00006%	0,02164%	0,02311%	0,13219%	0,26182%	0,46838%
Anoto Group AB	4,46%	4,42%	10,55%	0,00001%	0,00914%	0,00127%	0,00702%	0,02181%	0,11306%
Mobyson AB	4,46%	4,42%	5,57%	0,00051%	0,13922%	0,00231%	0,00648%	0,01016%	0,12705%
Aspiro AB	4,46%	4,42%	7,79%	0,08805%	3,30000%	0,00297%	0,01751%	0,03840%	0,15572%
Micronic Laser System	4,46%	4,42%	10,45%	0,00291%	0,24065%	0,01454%	0,03178%	0,03886%	0,34330%
Proffice AB	4,46%	4,42%	10,30%	0,05262%	0,65181%	1,17322%	2,14033%	2,45313%	2,34794%
Rederi AB Trans.	4,46%	4,42%	10,06%	0,12792%	0,97314%	0,42628%	0,83955%	0,62520%	2,61757%
Sigma AB	4,46%	4,42%	8,43%	0,01163%	0,31707%	0,54461%	1,91299%	2,77064%	2,86441%
Vitrolife AB	4,46%	4,42%	9,46%	0,00052%	0,05679%	0,03491%	0,41450%	0,97602%	2,22233%
Know It AB	4,46%	4,42%	11,74%	0,02184%	0,33790%	0,85844%	1,91261%	2,27226%	2,37571%
Raysearch Lab	4,46%	4,42%	8,39%	0,00000%	0,00243%	0,00000%	0,00000%	0,00000%	0,00000%

Indata for calculation of Implied ROE 2009 cont.

Company	Runstens Q	Historical ROE 99-08	Market value 16-04-2009
ABB Ltd.	0,33	21,76%	2,723E+11
Assa Abloy AB	0,33	14,80%	33372928750
Alfa Laval AB	0,33	16,06%	8040383493
Astra Zeneca PLC	1,74	30,20%	4,54311E+11
Atlas Copco AB	0,33	18,23%	38607316264
Boliden AB	0,31	7,23%	16788515802
Electrolux AB	0,33	15,96%	23728879115
LM Ericsson Tele	0,96	18,85%	1,22605E+12
Getinge AB	0,31	25,28%	17663968000
Lundin Petroleum AB	0,31	21,82%	13052277176
Modern Times GRP MTG	0,62	22,73%	11397229080
Scania AB	0,33	22,54%	65200000000
SKF AB	0,33	18,39%	38704840780
SSAB Svenskt Stål AB	0,31	18,43%	27048553713
Sandvik AB	0,33	20,10%	65230000000
Securitas AB	0,62	12,16%	23911357754
Skanska AB	0,38	19,56%	32046270204
Svenska Cellulosa AB	0,67	11,41%	33845284512
Swedish Match AB	0,72	43,09%	30153750000
Tele2 AB	0,96	3,87%	34787755781
Telia Sonera AB	0,96	12,45%	1,70188E+11
Volvo AB	0,33	12,51%	1,04917E+11
Eniro AB	0,62	17,65%	3026361013
Sas AB	0,62	-3,46%	269780000
PA Resources AB	0,31	23,30%	3080895484
Kungsleden AB	0,56	26,45%	5528333592
JM AB	0,38	23,94%	4743362331
Net Insight AB	0,31	16,99%	1379002765
PEAB AB	0,38	24,30%	9503196333
Intrum Justitia AB	0,62	22,32%	4684998246
Billrud AB	0,67	12,55%	1064193708
Nobia AB	0,72	22,97%	4529254371
New Wave Group AB	0,72	23,23%	859160549,8
Gunnebo AB	0,96	11,79%	777823305,3
Haldex AB	0,33	9,56%	667902400
Betsson AB	0,62	12,14%	3482705046
Axis AB	0,33	13,13%	3746179800
Q-Med AB	1,74	15,79%	3418740800
Klövern AB	0,56	18,91%	2797969816
Neonet	0,62	4,51%	907670700
Munters AB	0,33	22,34%	2640000000
Bioinvent Intl.	1,74	-28,78%	1252372500
Active Biotech AB	1,74	-69,44%	2333038744
Precise Biometrics	0,31	-76,09%	160940754
Rottneros AB	0,67	1,29%	71604199,9
Pricer AB	0,31	11,47%	579195354
Karo Bio AB	1,74	-56,15%	1064812991
Tricorona	0,28	10,41%	1054012366
Fingerprint Cards AB	0,31	-32,63%	41562346,86
Biotage AB	0,44	-17,06%	451280232
Sensys Traffic AB	0,31	-36,84%	583003037,7
Artimplant	0,31	-36,51%	142187496
Biophausia AB	1,74	4,28%	500014860,7
Cision AB	0,62	1,72%	296686783,6
Modul 1 Data AB	0,59	-29,26%	54202418,68
Acando AB	0,59	20,74%	829570050,3
Anoto Group AB	0,31	-23,93%	511763790,7
Mobyson AB	0,31	-90,95%	118484172,5
Aspiro AB	0,62	-16,77%	201970401,9
Micronic Laser System	0,33	-1,17%	442582760,8
Proffice AB	0,62	10,05%	739071993,8
Rederi AB Trans.	0,65	9,35%	875658599,2
Sigma AB	0,59	-1,20%	391226584,2
Vitrolife AB	1,74	8,47%	506884019,2
Know It AB	0,59	22,62%	483932121
Raysearch Lab	0,31	40,62%	695940291,9

Appendix III - Historical ROE 2007 vs. Implied ROE 2007

Company	Historical ROE 2007	Implied ROE 2007	Difference	Absolute diff.	Ranking	Sign (+/-)	Rank +	Rank -
ABB Ltd.	0,157285008	0,980996763	0,823711755	0,823711755	59	1	59	
Assa Abloy AB	0,15573543	0,373486472	0,217751042	0,217751042	35	1	35	
Alfa Laval AB	0,133148686	0,147898025	0,014749339	0,014749339	1	1	1	
Astra Zeneca PLC	0,302016196	0,870831626	0,568815431	0,568815431	52	1	52	
Atlas Copco AB	0,165914645	0,199569465	0,03365482	0,03365482	3	1	3	
Boliden AB	0,052235853	0,256058021	0,203822169	0,203822169	33	1	33	
Electrolux AB	0,159577369	0,327882753	0,168305385	0,168305385	28	1	28	
LM Ericsson Tele	0,25181574	0,614949552	0,363133812	0,363133812	45	1	45	
Getinge AB	0,278349632	0,356299046	0,077949414	0,077949414	10	1	10	
Lundin Petroleum AB	0,333966995	-0,085524203	-0,419491198	0,419491198	47	-1		47
Modern Times GRP MTG	0,160339471	0,373839275	0,213499804	0,213499804	34	1	34	
Scania AB	0,22131868	0,072978528	-0,148340152	0,148340152	22	-1		22
SKF AB	0,155702802	0,286869898	0,131167096	0,131167096	19	1	19	
SSAB Svenskt Stål AB	0,101724912	0,276468553	0,17474364	0,17474364	29	1	29	
Sandvik AB	0,173583809	0,508140872	0,334557064	0,334557064	42	1	42	
Securitas AB	0,127718893	0,314546264	0,186827371	0,186827371	32	1	32	
Skanska AB	0,195590194	0,373515634	0,177925441	0,177925441	30	1	30	
Svenska Cellulosa AB	0,122127694	0,030099319	-0,092028375	0,092028375	15	-1		15
Swedish Match AB	0,397369856	0,65572022	0,258350363	0,258350363	39	1	39	
Tele2 AB	0,023551696	0,127485678	0,103933981	0,103933981	16	1	16	
Telia Sonera AB	0,115345262	0,170019999	0,054674737	0,054674737	7	1	7	
Volvo AB	0,136058441	-0,013965739	-0,15002418	0,15002418	24	-1		24
Eniro AB	0,176480476	0,427985229	0,251504753	0,251504753	38	1	38	
Sas AB	-0,034611308	-0,113944247	-0,079332939	0,079332939	11	-1		11
PA Resources AB	0,233048049	0,300361213	0,067313164	0,067313164	8	1	8	
Kungsleden AB	0,28158737	0,127207822	-0,154379548	0,154379548	25	-1		25
JM AB	0,152868344	0,448601246	0,295732902	0,295732902	40	1	40	
Net Insight AB	-0,803604072	0,597302819	1,40090689	1,40090689	66	1	66	
PEAB AB	0,198607164	0,157348478	-0,041258685	0,041258685	5	-1		5
Intrum Justitia AB	0,161508704	0,405997915	0,244489211	0,244489211	36	1	36	
Billrud AB	0,160424469	0,079509954	-0,080914515	0,080914515	12	-1		12
Nobia AB	0,22972973	0,108560683	-0,121169046	0,121169046	18	-1		18
New Wave Group AB	0,237731114	0,290079566	0,052348451	0,052348451	6	1	6	
Gunnebo AB	0,14793712	0,166949315	0,019012195	0,019012195	2	1	2	
Hallex AB	0,134431887	0,094680796	-0,039751091	0,039751091	4	-1		4
Betsson AB	0,067782306	0,246658113	0,178875807	0,178875807	31	1	31	
Axis AB	0,124322398	0,703482303	0,579159904	0,579159904	53	1	53	
Q-Med AB	0,19093813	0,653143743	0,462205613	0,462205613	48	1	48	
Klövern AB	0,189139576	0,106938208	-0,082201368	0,082201368	13	-1		13
Neonet	-0,029921443	0,479234389	0,509155832	0,509155832	51	1	51	
Munters AB	0,263655257	0,104848084	-0,158807173	0,158807173	27	-1		27
Bioinvent Intl.	-0,400164128	0,305163205	0,705327333	0,705327333	54	1	54	
Active Biotech AB	-0,417134546	0,71253756	1,129672106	1,129672106	65	1	65	
Precise Biometrics	-0,80478846	0,199173225	1,003961685	1,003961685	63	1	63	
Rottneros AB	0,040440025	-0,105702653	-0,146142678	0,146142678	21	-1		21
Pricer AB	-0,697741671	0,111876694	0,809618365	0,809618365	58	1	58	
Karo Bio AB	-0,442373012	0,29009645	0,732469462	0,732469462	55	1	55	
Tricorona	-0,217067699	0,098456029	0,315523727	0,315523727	41	1	41	
Fingerprint Cards AB	-0,286831691	0,201635632	0,488467323	0,488467323	50	1	50	
Biotage AB	-0,201606461	0,184446695	0,386053156	0,386053156	46	1	46	
Sensys Traffic AB	-0,469787823	0,456442156	0,926229979	0,926229979	61	1	61	
Artimplant	-0,377848613	0,35830249	0,736151103	0,736151103	56	1	56	
Biophausia AB	-0,832586167	0,140598335	0,973184502	0,973184502	62	1	62	
Cision AB	0,033573908	0,125279726	0,091705818	0,091705818	14	1	14	
Modul 1 Data AB	-0,292584966	0,171152213	0,463737179	0,463737179	49	1	49	
Acando AB	0,032684681	0,189871481	0,1571868	0,1571868	26	1	26	
Anoto Group AB	-0,506158538	0,281498061	0,787656599	0,787656599	57	1	57	
Mobyson AB	-0,662622701	0,178847678	0,841470379	0,841470379	60	1	60	
Aspiro AB	-0,992462228	0,028146244	1,020608472	1,020608472	64	1	64	
Micronic Laser System	0,050529822	0,187660929	0,137131108	0,137131108	20	1	20	
Proffice AB	0,06440678	0,424852797	0,360446018	0,360446018	43	1	43	
Rederi AB Trans.	0,024769078	0,096760832	0,071991754	0,071991754	9	1	9	
Sigma AB	-0,037745907	0,211723797	0,249469703	0,249469703	37	1	37	
Vitrolife AB	-0,046292099	0,315552249	0,361844349	0,361844349	44	1	44	
Know It AB	0,125824609	0,229870746	0,104046137	0,104046137	17	1	17	
Raysearch Lab	0,449532349	0,299738671	-0,149793678	0,149793678	23	-1		23
						Rank Sum	1944	267

Appendix IV - Historical ROE 2009 vs. Implied ROE 2009

Company	Historical ROE 2009	Implied ROE 2009	Difference	Absolute diff.	Ranking	Sign (+/-)	Rank +	Rank -
ABB Ltd.	0,980996763	0,830966421	0,150030342	0,150030342	35	1	35	
Assa Abloy AB	0,373486472	0,1970149	0,176471572	0,176471572	39	1	39	
Alfa Laval AB	0,147898025	0,369307479	-0,221409454	0,221409454	49	-1		49
Astra Zeneca PLC	0,870831626	0,861464189	0,009367437	0,009367437	2	1	2	
Atlas Copco AB	0,199569465	0,51574827	-0,316178805	0,316178805	58	-1		58
Boliden AB	0,256058021	0,089446199	0,166611822	0,166611822	38	1	38	
Electrolux AB	0,327882753	0,143766592	0,184116161	0,184116161	43	1	43	
LM Ericsson Tele	0,614949552	0,113658769	0,501290783	0,501290783	64	1	64	
Getinge AB	0,356299046	0,213603201	0,142695845	0,142695845	30	1	30	
Lundin Petroleum AB	-0,085524203	-0,032307709	-0,053216493	0,053216493	13	-1		13
Modern Times GRP MTG	0,373839275	0,110988229	0,262841046	0,262841046	54	1	54	
Scania AB	0,072978528	0,35961893	-0,286640402	0,286640402	56	-1		56
SKF AB	0,286869898	0,436384422	-0,149514523	0,149514523	34	-1		34
SSAB Svenskt Stål AB	0,276468553	0,06157105	0,214897503	0,214897503	48	1	48	
Sandvik AB	0,508140872	0,844001647	-0,335860775	0,335860775	59	-1		59
Securitas AB	0,314546264	0,276701124	0,03784514	0,03784514	10	1	10	
Skanska AB	0,373515634	0,195823333	0,177692301	0,177692301	40	1	40	
Svenska Cellulosa AB	0,030099319	-0,027229309	0,057328628	0,057328628	14	1	14	
Swedish Match AB	0,65572022	1,334657157	-0,678936938	0,678936938	65	-1		65
Tele2 AB	0,127485678	0,087789838	0,039695839	0,039695839	11	1	11	
Telia Sonera AB	0,170019999	0,068345767	0,101674232	0,101674232	20	1	20	
Volvo AB	-0,013965739	0,14273043	-0,15669617	0,15669617	37	-1		37
Eniro AB	0,427985229	0,284253826	0,143731403	0,143731403	31	1	31	
Sas AB	-0,113944247	-0,133864603	0,019920356	0,019920356	5	1	5	
PA Resources AB	0,300361213	0,154001902	0,146359311	0,146359311	33	1	33	
Kungsleden AB	0,127207822	0,099122729	0,028085093	0,028085093	7	1	7	
JM AB	0,448601246	0,181433853	0,267167393	0,267167393	55	1	55	
Net Insight AB	0,597302819	0,260339711	0,336963108	0,336963108	60	1	60	
PEAB AB	0,157348478	0,188473994	-0,031125515	0,031125515	9	-1		9
Intrum Justitia AB	0,405997915	0,181456923	0,224540992	0,224540992	50	1	50	
Billrud AB	0,079509954	-0,026512857	0,106022811	0,106022811	21	1	21	
Nobia AB	0,108560683	0,094749724	0,01381096	0,01381096	4	1	4	
New Wave Group AB	0,290079566	0,0334607	0,256618865	0,256618865	53	1	53	
Gunnebo AB	0,166949315	0,030205146	0,136744168	0,136744168	28	1	28	
Haldex AB	0,094680796	0,026038098	0,068642699	0,068642699	17	1	17	
Betsson AB	0,246658113	0,630986124	-0,384328011	0,384328011	62	-1		62
Axis AB	0,703482303	0,734383085	-0,030900782	0,030900782	8	-1		8
Q-Med AB	0,653143743	0,166161308	0,486982435	0,486982435	63	1	63	
Klövern AB	0,106938208	0,093558149	0,01338006	0,01338006	3	1	3	
Neonet	0,479234389	0,294521988	0,184712401	0,184712401	44	1	44	
Munters AB	0,104848084	0,216820824	-0,11197274	0,11197274	23	-1		23
Bioinvent Intl.	0,305163205	0,198308794	0,106854411	0,106854411	22	1	22	
Active Biotech AB	0,71253756	0,372895207	0,339642353	0,339642353	61	1	61	
Precise Biometrics	0,199173225	0,910836542	-0,711663317	0,711663317	66	-1		66
Rottneros AB	-0,105702653	-0,102306781	-0,003395872	0,003395872	1	-1		1
Pricer AB	0,111876694	0,053344872	0,058531822	0,058531822	15	1	15	
Karo Bio AB	0,29009645	0,219398886	0,070697564	0,070697564	18	1	18	
Tricorona	0,098456029	0,23515006	-0,136694031	0,136694031	27	-1		27
Fingerprint Cards AB	0,201635632	0,015218121	0,186417511	0,186417511	45	1	45	
Biotage AB	0,184446695	-0,069332344	0,253779039	0,253779039	51	1	51	
Sensys Traffic AB	0,456442156	0,314707925	0,141734231	0,141734231	29	1	29	
Artimplant	0,35830249	0,235519575	0,122782915	0,122782915	24	1	24	
Biophausia AB	0,140598335	0,07717999	0,063418345	0,063418345	16	1	16	
Cision AB	0,125279726	-0,055381913	0,180661639	0,180661639	41	1	41	
Modul 1 Data AB	0,171152213	0,024916541	0,146235672	0,146235672	32	1	32	
Acando AB	0,189871481	0,057950817	0,131920664	0,131920664	25	1	25	
Anoto Group AB	0,281498061	0,078800252	0,202697809	0,202697809	47	1	47	
Mobyson AB	0,178847678	-0,005077179	0,183924857	0,183924857	42	1	42	
Aspiro AB	0,028146244	-0,017824562	0,045970806	0,045970806	12	1	12	
Micronic Laser System	0,187660929	-0,010708948	0,198369877	0,198369877	46	1	46	
Proffice AB	0,424852797	0,131267899	0,293584898	0,293584898	57	1	57	
Rederi AB Trans.	0,096760832	-0,002606048	0,09936688	0,09936688	19	1	19	
Sigma AB	0,211723797	0,059141804	0,152581993	0,152581993	36	1	36	
Vitrolife AB	0,315552249	0,060621367	0,254930882	0,254930882	52	1	52	
Know It AB	0,229870746	0,093698262	0,136172484	0,136172484	26	1	26	
Raysearch Lab	0,299738671	0,273239101	0,026499571	0,026499571	6	1	6	
						Rank Sum	1644	567

Appendix V - Implied ROE 2007 vs. Implied ROE 2009

Company	Implied ROE 2007	Implied ROE 2009	Difference	Absolute diff.	Ranking	Sign (+/-)	Rank +	Rank -
ABB Ltd.	0,217640152	0,830966421	0,613326269	0,613326269	57	1	57	
Assa Abloy AB	0,14800853	0,1970149	0,04900637	0,04900637	12	1	12	
Alfa Laval AB	0,160627806	0,369307479	0,208679673	0,208679673	41	1	41	
Astra Zeneca PLC	0,302016196	0,861464189	0,559447994	0,559447994	52	1	52	
Atlas Copco AB	0,182277053	0,51574827	0,333471217	0,333471217	47	1	47	
Boliden AB	0,072301268	0,089446199	0,017144931	0,017144931	6	1	6	
Electrolux AB	0,159577369	0,143766592	-0,015810777	0,015810777	5	-1		5
LM Ericsson Tele	0,188462385	0,113658769	-0,074803616	0,074803616	20	-1		20
Getinge AB	0,252755135	0,213603201	-0,039151934	0,039151934	10	-1		10
Lundin Petroleum AB	0,218230652	-0,032307709	-0,250538362	0,250538362	43	-1		43
Modern Times GRP MTG	0,227269091	0,11098229	-0,116270862	0,116270862	29	-1		29
Scania AB	0,225362363	0,35961893	0,134256567	0,134256567	33	1	33	
SKF AB	0,18386906	0,436384422	0,252515362	0,252515362	44	1	44	
SSAB Svenskt Stål AB	0,184267092	0,06157105	-0,122669043	0,122669043	30	-1		30
Sandvik AB	0,201049979	0,844001647	0,642951668	0,642951668	58	1	58	
Securitas AB	0,121639834	0,276701124	0,15506129	0,15506129	38	1	38	
Skanska AB	0,195590194	0,195823333	0,000233139	0,000233139	1	1	1	
Svenska Cellulosa AB	0,11410218	-0,027229309	-0,141331489	0,141331489	35	-1		35
Swedish Match AB	0,430890248	1,334657157	0,903766909	0,903766909	62	1	62	
Tele2 AB	0,038678429	0,087789838	0,04911141	0,04911141	13	1	13	
Telia Sonera AB	0,12452483	0,068345767	-0,056179063	0,056179063	15	-1		15
Volvo AB	0,125061493	0,14273043	0,017668938	0,017668938	7	1	7	
Eniro AB	0,176480476	0,284253826	0,10777335	0,10777335	27	1	27	
Sas AB	-0,034611308	-0,133864603	-0,099253295	0,099253295	25	-1		25
PA Resources AB	0,233048049	0,154001902	-0,079046147	0,079046147	21	-1		21
Kungsleden AB	0,264476702	0,099122729	-0,165353973	0,165353973	39	-1		39
JM AB	0,239443316	0,181433853	-0,058009464	0,058009464	16	-1		16
Net Insight AB	-0,728451127	0,260339711	0,988790838	0,988790838	64	1	64	
PEAB AB	0,243037805	0,188473994	-0,054563811	0,054563811	14	-1		14
Intrum Justitia AB	0,223212421	0,181456923	-0,041755498	0,041755498	11	-1		11
Billerud AB	0,125466766	-0,026512857	-0,151979623	0,151979623	37	-1		37
Nobia AB	0,22972973	0,094749724	-0,134980006	0,134980006	34	-1		34
New Wave Group AB	0,232328203	0,0334607	-0,198867503	0,198867503	40	-1		40
Gunnebo AB	0,117922271	0,030205146	-0,087717125	0,087717125	22	-1		22
Haldex AB	0,095562816	0,026038098	-0,069524718	0,069524718	17	-1		17
Betsson AB	0,121414307	0,630986124	0,509571817	0,509571817	51	1	51	
Axis AB	0,131330261	0,734383085	0,603052823	0,603052823	56	1	56	
Q-Med AB	0,157876365	0,166161308	0,008284943	0,008284943	4	1	4	
Klövern AB	0,189139576	0,093558149	-0,095581427	0,095581427	23	-1		23
Neonet	0,045069436	0,294521988	0,249452551	0,249452551	42	1	42	
Munters AB	0,223427055	0,216820824	-0,006606231	0,006606231	3	-1		3
Bioinvent Intl.	-0,287842164	0,198308794	0,486150959	0,486150959	50	1	50	
Active Biotech AB	-0,694408296	0,372895207	1,067303503	1,067303503	65	1	65	
Precise Biometrics	-0,760944369	0,910836542	1,671780911	1,671780911	66	1	66	
Rottneros AB	0,012901555	-0,102306781	-0,115208336	0,115208336	28	-1		28
Pricer AB	-0,53106653	0,053344872	0,584411402	0,584411402	53	1	53	
Karo Bio AB	-0,561497258	0,219398886	0,780896144	0,780896144	61	1	61	
Tricorona	-0,159627892	0,23515006	0,394777952	0,394777952	49	1	49	
Fingerprint Cards AB	-0,326257379	0,015218121	0,3414755	0,3414755	48	1	48	
Biotage AB	-0,170554637	-0,069332344	0,101222293	0,101222293	26	1	26	
Sensys Traffic AB	-0,368398906	0,314707925	0,683106831	0,683106831	59	1	59	
Artimplant	-0,365059343	0,235519575	0,600578919	0,600578919	54	1	54	
Biophausia AB	-0,525554512	0,07717999	0,602734501	0,602734501	55	1	55	
Cision AB	0,017198669	-0,055381913	-0,072580583	0,072580583	19	-1		19
Modul 1 Data AB	-0,292584966	0,024916541	0,317501507	0,317501507	45	1	45	
Acando AB	0,207397306	0,057950817	-0,149446489	0,149446489	36	-1		36
Anoto Group AB	-0,239279094	0,078800252	0,318079346	0,318079346	46	1	46	
Mobyson AB	-0,909531475	-0,005077179	0,904454296	0,904454296	63	1	63	
Aspiro AB	-0,786408021	-0,017824562	0,768583459	0,768583459	60	1	60	
Micronic Laser System	-0,011662056	-0,010708948	0,000953107	0,000953107	2	1	2	
Proffice AB	0,10054052	0,131267899	0,030727379	0,030727379	9	1	9	
Rederi AB Trans.	0,093513436	-0,002606048	-0,096119484	0,096119484	24	-1		24
Sigma AB	-0,011972699	0,059141804	0,071114503	0,071114503	18	1	18	
Vitrolife AB	0,084676555	0,060621367	-0,024055188	0,024055188	8	-1		8
Know It AB	0,226212738	0,093698262	-0,132514477	0,132514477	31	-1		31
Raysearch Lab	0,406223086	0,273239101	-0,132983986	0,132983986	32	-1		32
Rank Sum:							1544	667

Appendix VI - Wilcoxon Ranked Sign Test for r_E 2007 vs. r_E 2009

Hypothesis:

$$H_0: r_E 2009 \leq r_E 2007$$

$$H_1: r_E 2009 > r_E 2007$$

Company	Re 07	Re 09	Diff. (09-07)	Abs. Diff	Sign	Rank	Rank +	Rank -
ABB Ltd.	0,099515139	0,109393562	0,009878423	0,009878423	1	18	18	
Assa Abloy AB	0,104483741	0,093119226	-0,011364514	0,011364514	-1	21		21
Alfa Laval AB	0,082958155	0,10741328	0,024455125	0,024455125	1	46	46	
Astra Zeneca PLC	0,085646556	0,066950322	-0,018696234	0,018696234	-1	33		33
Atlas Copco AB	0,123014416	0,102830414	-0,020184002	0,020184002	-1	39		39
Boliden AB	0,119109326	0,110650413	-0,008458913	0,008458913	-1	15		15
Electrolux AB	0,091837607	0,09367154	0,001833933	0,001833933	1	3	3	
LM Ericsson Tele	0,10392456	0,094062897	-0,009861663	0,009861663	-1	17		17
Getinge AB	0,08605987	0,088903466	0,002843596	0,002843596	1	4	4	
Lundin Petroleum AB	0,049342217	0,075514403	0,026172186	0,026172186	1	49	49	
Modern Times GRP MTG	0,12382422	0,110018564	-0,013805655	0,013805655	-1	27		27
Scania AB	0,101054201	0,115850804	0,014796604	0,014796604	1	30	30	
SKF AB	0,092064478	0,093220685	0,001156207	0,001156207	1	1	1	
SSAB Svenskt Stål AB	0,073325458	0,109246617	0,035921159	0,035921159	1	53	53	
Sandvik AB	0,079032719	0,10232495	0,02329223	0,02329223	1	44	44	
Securitas AB	0,105870831	0,079191678	-0,026679154	0,026679154	-1	50		50
Skanska AB	0,113497105	0,094694899	-0,018802206	0,018802206	-1	34		34
Svenska Cellulosa AB	0,073657997	0,077821703	0,004163707	0,004163707	1	6	6	
Swedish Match AB	0,046762949	0,066415072	0,019652123	0,019652123	1	37	37	
Tele2 AB	0,103202501	0,087656602	-0,015545899	0,015545899	-1	31		31
Telia Sonera AB	0,091805363	0,083939841	-0,007865522	0,007865522	-1	13		13
Volvo AB	0,098526468	0,12031143	0,021784961	0,021784961	1	43	43	
Eniro AB	0,093757155	0,117763164	0,024006009	0,024006009	1	45	45	
Sas AB	0,120595224	0,115461707	-0,005133516	0,005133516	-1	7		7
PA Resources AB	0,103361636	0,146167169	0,042805533	0,042805533	1	58	58	
Kungsliden AB	0,082102653	0,115706217	0,033603564	0,033603564	1	52	52	
JM AB	0,093827534	0,11410576	0,020278226	0,020278226	1	40	40	
Net Insight AB	0,163504119	0,075571716	-0,087932403	0,087932403	-1	66		66
PEAB AB	0,072239283	0,110169637	0,037930354	0,037930354	1	55	55	
Intrum Justitia AB	0,074964474	0,066878435	-0,008086039	0,008086039	-1	14		14
Billerud AB	0,081111928	0,094055223	0,012943295	0,012943295	1	25	25	
Nobia AB	0,088749982	0,101410491	0,012660509	0,012660509	1	24	24	
New Wave Group AB	0,085215321	0,09738504	0,012169719	0,012169719	1	22	22	
Gunnebo AB	0,079901448	0,087224287	0,007322839	0,007322839	1	12	12	
Hallex AB	0,088466879	0,13167662	0,043209742	0,043209742	1	59	59	
Betsson AB	0,132039997	0,095139814	-0,036900183	0,036900183	-1	54		54
Axis AB	0,094759372	0,114460196	0,019700824	0,019700824	1	38	38	
Q-Med AB	0,116080639	0,098372222	-0,017708417	0,017708417	-1	32		32
Klövern AB	0,095901451	0,108878117	0,012976665	0,012976665	1	26	26	
Neonet	0,105513201	0,091296436	-0,014216765	0,014216765	-1	29		29
Munters AB	0,069579585	0,078190533	0,008610948	0,008610948	1	16	16	
Bioinvent Intl.	0,11436974	0,086727657	-0,027642083	0,027642083	-1	51		51
Active Biotech AB	0,115008153	0,065414349	-0,049593805	0,049593805	-1	61		61
Precise Biometrics	0,053758667	0,067856972	0,014098305	0,014098305	1	28	28	
Rottneros AB	0,092897215	0,099414959	0,006517745	0,006517745	1	11	11	
Pricer AB	0,080764479	0,061324253	-0,019440226	0,019440226	-1	36		36
Karo Bio AB	0,153819464	0,1153021	-0,038517364	0,038517364	-1	56		56
Tricorona	0,042527605	0,11690157	0,074373965	0,074373965	1	64	64	
Fingerprint Cards AB	0,141658539	0,086246424	-0,055412115	0,055412115	-1	62		62
Biotope AB	0,145280866	0,066143225	-0,079137641	0,079137641	-1	65		65
Sensys Traffic AB	0,104467267	0,085638321	-0,018828946	0,018828946	-1	35		35
Artimplant	0,164938221	0,10333211	-0,061606111	0,061606111	-1	63		63
Biophausia AB	0,075647717	0,077325237	0,001677519	0,001677519	1	2	2	
Cision AB	0,126804156	0,120802386	-0,00600177	0,00600177	-1	9		9
Modul 1 Data AB	0,071831365	0,065991113	-0,005840252	0,005840252	-1	8		8
Acando AB	0,133978012	0,092988565	-0,040989448	0,040989448	-1	57		57
Anoto Group AB	0,117815392	0,105505605	-0,012309788	0,012309788	-1	23		23
Mobyson AB	0,080931027	0,055703526	-0,025227501	0,025227501	-1	48		48
Aspiro AB	0,073698566	0,077856361	0,004157795	0,004157795	1	5	5	
Micronic Laser System	0,153800138	0,104538462	-0,049261676	0,049261676	-1	60		60
Proffice AB	0,127933438	0,103023344	-0,024910094	0,024910094	-1	47		47
Rederi AB Trans.	0,080039451	0,100618428	0,020578977	0,020578977	1	42	42	
Sigma AB	0,0903333	0,084284427	-0,006048874	0,006048874	-1	10		10
Vitrolife AB	0,104859358	0,094588561	-0,010270797	0,010270797	-1	19		19
Know It AB	0,097080511	0,117370618	0,020290107	0,020290107	1	41	41	
Raysearch Lab	0,073349938	0,08385271	0,010502772	0,010502772	1	20	20	
						Sum	1019	1192

Mean	Var	Std	Z	P-value
1105,5	24505,25	156,541528	-0,55256903	0,290279278

Appendix VII – Wilcoxon Ranked Sign Test for P_{fail} 2007 vs. P_{fail} 2009

Hypothesis:

$$H_0: P_{fail} 2009 \leq P_{fail} 2007$$

$$H_1: P_{fail} 2009 > P_{fail} 2007$$

Company	Av. P-fail 07	Av. P-fail 09	Diff. (09-07)	Abs. Diff	Sign	Rank	Rank +	Rank -
ABB Ltd.	0,012054526	0,011851333	-0,000203192	0,000203192	-1	6		6
Assa Abloy AB	0,015116595	0,026060883	0,010944288	0,010944288	1	30	30	
Alfa Laval AB	0,015460763	0,048411551	0,032950788	0,032950788	1	49	49	
Astra Zeneca PLC	0,003466814	0,045842551	0,042375737	0,042375737	1	54	54	
Atlas Copco AB	0,002125385	0,097245087	0,095119702	0,095119702	1	62	62	
Boliden AB	0,001911407	0,009413639	0,007502232	0,007502232	1	24	24	
Electrolux AB	0,017557333	0,032290224	0,014732891	0,014732891	1	35	35	
LM Ericsson Tele	0,002111461	0,008636831	0,00652537	0,00652537	1	23	23	
Getinge AB	0,009522443	0,045024398	0,035501954	0,035501954	1	51	51	
Lundin Petroleum AB	0,002002402	0,082797799	0,080795397	0,080795397	1	61	61	
Modern Times GRP MTG	0,003042531	0,013985455	0,010942923	0,010942923	1	29	29	
Scania AB	0,006136839	0,035704267	0,029567428	0,029567428	1	47	47	
SKF AB	0,003177852	0,132349251	0,129171398	0,129171398	1	64	64	
SSAB Svenskt Stål AB	0,001334717	0,009376259	0,008041542	0,008041542	1	25	25	
Sandvik AB	0,045203713	0,258851969	0,213648256	0,213648256	1	66	66	
Securitas AB	0,021320068	0,040106881	0,018786813	0,018786813	1	41	41	
Skanska AB	0,006882619	0,017879392	0,010996773	0,010996773	1	31	31	
Svenska Cellulosa AB	0,008927584	0,020788019	0,011860436	0,011860436	1	33	33	
Swedish Match AB	0,013128843	0,06335672	0,050227877	0,050227877	1	58	58	
Tele2 AB	0,006234625	0,025873757	0,019639132	0,019639132	1	42	42	
Telia Sonera AB	0,000967575	0,009179752	0,008212177	0,008212177	1	26	26	
Volvo AB	0,006962143	0,009389142	0,002426999	0,002426999	1	14	14	
Eniro AB	0,020333357	0,116963421	0,096630064	0,096630064	1	63	63	
Sas AB	0,009897142	0,050190529	0,040293387	0,040293387	1	53	53	
PA Resources AB	0,030456641	0,063664981	0,033208341	0,033208341	1	50	50	
Kungsleden AB	0,011345056	0,056862379	0,045517323	0,045517323	1	55	55	
JM AB	0,0021486	0,015205221	0,013056622	0,013056622	1	34	34	
Net Insight AB	0,000139359	5,67361E-05	-8,26229E-05	8,26229E-05	-1	5		5
PEAB AB	0,013487202	0,029575622	0,01608842	0,01608842	1	36	36	
Intrum Justitia AB	0,00930685	0,028007741	0,018700891	0,018700891	1	40	40	
Billerud AB	0,008542637	0,033213428	0,024670791	0,024670791	1	44	44	
Nobia AB	0,009758745	0,026636584	0,016877839	0,016877839	1	38	38	
New Wave Group AB	0,021281391	0,069302999	0,048021608	0,048021608	1	57	57	
Gunnebo AB	0,02487273	0,051969789	0,027097059	0,027097059	1	45	45	
Haldex AB	0,007473954	0,046878042	0,039404087	0,039404087	1	52	52	
Betsson AB	0,00040832	0,000457167	4,88467E-05	4,88467E-05	1	4	4	
Axis AB	0,000221071	0,002284257	0,002063186	0,002063186	1	13	13	
Q-Med AB	2,00907E-05	0,000684641	0,00066455	0,00066455	1	7	7	
Klövern AB	0,010630927	0,042106192	0,031475265	0,031475265	1	48	48	
Neonet	0,035762227	0,030681733	-0,005080494	0,005080494	-1	19		19
Munters AB	0,003499799	0,026995201	0,023495402	0,023495402	1	43	43	
Bioinvent Intl.	0,005185206	0,000243376	-0,00494183	0,00494183	-1	18		18
Active Biotech AB	0,092590188	0,063798858	-0,028791329	0,028791329	-1	46		46
Precise Biometrics	0,038339339	0,237983794	0,199644455	0,199644455	1	65	65	
Rottneros AB	0,004640436	0,050258853	0,045618417	0,045618417	1	56	56	
Pricer AB	0,003335209	0,004404873	0,001069664	0,001069664	1	10	10	
Karo Bio AB	0,00106833	0,004784586	0,003716256	0,003716256	1	17	17	
Tricorona	0,000241866	0,000207023	-3,48424E-05	3,48424E-05	-1	3		3
Fingerprint Cards AB	0,000553318	0,002988728	0,00243541	0,00243541	1	15	15	
Biotage AB	0,001531614	9,29182E-05	-0,001438696	0,001438696	-1	12		12
Sensys Traffic AB	8,72847E-08	0,008352437	0,00835235	0,00835235	1	27	27	
Artimplant	0,001603681	0,00231016	0,000706479	0,000706479	1	8	8	
Biophausia AB	0,027198771	0,083888892	0,056690121	0,056690121	1	60	60	
Cision AB	0,013461435	0,018624943	0,005163508	0,005163508	1	20	20	
Modul 1 Data AB	0,002913485	0,019560601	0,016647116	0,016647116	1	37	37	
Acando AB	0,000389365	0,001511999	0,001122634	0,001122634	1	11	11	
Anoto Group AB	0,000231329	0,000253838	2,25093E-05	2,25093E-05	1	2	2	
Mobyson AB	0,018367518	0,000476201	-0,017891316	0,017891316	-1	39		39
Aspiro AB	8,95637E-05	0,006004402	0,005914838	0,005914838	1	21	21	
Micronic Laser System	0,000105727	0,001120063	0,001014336	0,001014336	1	9	9	
Proffice AB	0,008716911	0,014698445	0,005981534	0,005981534	1	22	22	
Rederi AB Trans.	0,006425908	0,009349437	0,002923529	0,002923529	1	16	16	
Sigma AB	0,005370542	0,014035593	0,008665052	0,008665052	1	28	28	
Vitrolife AB	0,058966542	0,006175088	-0,052791454	0,052791454	-1	59		59
Know It AB	0,001607959	0,012964599	0,011356639	0,011356639	1	32	32	
Raysearch Lab	1,57465E-07	4,05578E-06	3,89831E-06	3,89831E-06	1	1	1	
						Sum	2004	207

Mean	Var	Std	Z	P-value
1105,5	24505,25	156,541528	-5,739691	0,00000000474

Appendix VIII – Permanent Measurement Bias (q) according to Runsten (1998)

Industry	PMB (q)
Pharmaceutical	1,74
Capital intensive services	0,96
Consumer goods	0,72
Investment companies	0,68
Pulp and paper	0,67
Shipping	0,65
Other services	0,62
Consultant and Computer	0,59
Real estate	0,56
Mixed build. and real estate	0,55
Trading and retail	0,47
Chemical industry	0,44
Building and construction	0,38
Engineering	0,33
Other production	0,31
Congl. and mix. Inv.	0,28

Appendix IX – Symmetry test for WRST

