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Keskusteluaiheita
Discussion papers

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PERCEIVED AND MEASURED RISK;

AN EMPIRICAL ANALYSIS*

No 303 30.10.1989

* The help received from Johan Weckman in collecting and preparing the data as well as helpful comments from Gunnar Rosenqvist, Joseph Lakonishok, Kari Alho, Vesa Kanniainen and participants at the seminar at the Swedish School of Economics and Business Administration and at the Research Institute of the Finnish Economy are gratefully acknowledged. John Rogers' suggestions have made the language more readable. I am also grateful for financial support for the project obtained from the Yrjö Jahnsson Foundation.

ISSN 0781-6847

BERGLUND, Tom, PERCEIVED AND MEASURED RISK; AN EMPIRICAL ANALYSIS, Helsinki : ETLA, Elinkeinoelämän Tutkimuslaitos, The Research Institute of the Finnish Economy, 1989. 29 p. (Keskusteluaiheita, Discussion Papers, ISSN 0781-6847 ; no. 303).

ABSTRACT: This paper investigates risk assessments of investment experts. A sample of investment experts in Finland were asked to rank 15 stocks listed on the Helsinki Stock Exchange in the order of riskiness. The same experts were later given a ranking task to check for consistency between their views and the CAPM. Among other findings, the results reveal that perceived riskiness was highly correlated with the expected performance in the case of a market drop. Furthermore, perceived riskiness was more significantly correlated with firm size than with traditional risk measures.

KEY WORDS: Anomalies, assets, beta, earnings, returns.

CONTENTS

Perceived and Measured Risk; An Empirical Analysis

1. Introduction

In a world with risk averse investors the assessment of the riskiness of an investment is an essential part of the evaluation of the project. To determine the riskiness of the project the most straightforward method would be to compare this particular project with similar investments in the past. This could be done in an *ad hoc* fashion referring to previous experiences or more thoroughly using applicable statistical procedures. Assuming an infinite number of previous exact replicas of the project we could assess the riskiness of the project as exactly as we like by sampling from this population of replicas. If there were an infinite number of previous exact replicas, rationality would furthermore require that expectations be based on the information supplied by these replicas. In other words there would be no reason to make a distinction between ex ante risk expectations and the ex post risk measures computed with available data.

In practice, even in the case of portfolio investments, it is clearly impossible to observe but a small number of close replicas of an investment. Furthermore, and what is more important, how closely our data actually replicates the investment at hand is open to question. Stock prices are prices that relate to firms which undergo internal changes as well as changes in their environment. These firms occasionally make unique investments in new technology. Furthermore, their shares are traded on markets which undergo changes. Thus, the question of how well ex ante risk expectations correspond to different ex post risk measures becomes highly relevant. Which data investors use as their conditioning set and what information they filter from the data are questions lacking obvious answers.

This paper sets out to find answers to these questions. This is done by comparing the subjective risk-related beliefs of investment experts with different risk measures coumpted from historical data. This is done based on unique survey data collected from investment experts in Finland in the beginning of 1984, at a time when standard financial theory was largely unknown among Finnish investment experts. The views held by these experts are compared with the standard deviation and the beta for the the stock. The correspondence of these riskassessments with firm size and the E/P ratio will also be analysed to see whether these variables are related to the perceived riskiness of a firm.

The outline of the paper is such that first the problem is formulated in general terms and then the hypotheses are formulated. The consequent analysis of the data starts with the degree of correspondence between the views held by the investment experts in the sample. Next, these views are contrasted with risk as measured by historical data. Finally, the possibilty that firm size and the E/P ratio may proxy risk as perceived by practioners is analyzed. The last section summarizes the results.

2. Background

Restricting the analysis to stock market investments, risk can be interpreted as a mapping from the set of available relevant information concerning the firm as well as available information concerning general conditions on the market ideally to the real axis, i.e.

$$\text{(1)} \qquad \text{Risk}_t^i = F(I_t^i, I_t^m).$$

The risk of the i:th firm at time t is a function of the market information (I_t^m) at time t and the firm specific information at time t (I_t^i) . In the finance literature this is usually simplified by assuming that the the relevant conditioning information set is restricted to previous prices and the mapping is given by some function taken from the mean-variance approach.

According to the Capital Asset Pricing Model (CAPM) of Sharpe (1964) and Lintner (1965) the relevant risk measure for an individual asset is its so called ß coefficient, where relevant risk stands for the risk that should command a premium from risk averse investors. The ß-coefficient for asset i is defined as:

$$\text{(2)} \qquad ß_i = \frac{\text{cov}(r_i, r_m)}{\sigma_m^2},$$

where the term in the denominator denotes the covariance operator ,r_i the return on asset i, r_m is the return on the market portfolio and σ^2_m the variance of the return on the market portfolio. The intuitive reason for ß being the relevant risk measure is that only the asset´s nondiversifiable risk should be repulsive to the risk averse investor, since by definition other potential fluctuations in the price can be eliminated by diversification. By contrast it was previously held that the relevant risk for an asset

could be determined by looking exclusively at data for that asset. If this were the case, given well known restrictions on either investors utility functions or return distributions, the appropriate risk measure would be the return variance σ_i^2 or standard deviation σ_i. In this study we will analyze whether subjectively perceived risk will correspond more closely to measures given by the CAPM than to traditional measures like the standard deviation.

Since the sixties several papers have appeared which dispute the conclusion that the ß coefficient as defined by the CAPM should be the only relevant risk-measure. For instance, Mayshar (1979, 1981) shows that transaction costs will make it optimal for investors to hold less than perfectly diversified portfolios. If investors in general hold less than perfectly diversified portfolios the idiosyncratic variance will enter the pricing equation for the asset. Thus the question of the relevant risk-measure cannot be regarded as completely settled even on a theoretical level.

3. The Hypothesis

The general purpose of this paper is to investigate the subjective risk assessment of experts involved in either in professional management of stock portfolios or in investment counselling. Do experts agree on the riskiness of different stocks ? Are their risk assessments consistent with risk as measured for example by the stocks´ betas calculated using historical data?

More precisely, the basic questions that we we are trying to answer in this paper are the following:

1. Is there any consistency between subjective risk assessments among professional investment experts ?
2. How well do subjective risk assessments of experts correspond to different risk measures using actual data? This question relates to statistical risk measures, i.e. to the beta coeffcient and the variance of the return, as well as to possible proxies, i.e. firm size and the E/P ratio.
3. Are the experts´ expectations consistent with the CAPM ?

The only method to obtain the data on risk assessments by investment experts, which constitute the nucleus of this study, is to use the survey method. However, it is well known that there are several problems connected with the use of the surveys. In this case one such problem is that practitioners may in fact try to confirm or refute the expectations held by those who are conducting the survey. When asked about the riskiness of a particular stock the practitioner may e.g. look up computed beta-estimates and base his answer on these. The motive may be that the practitioner wants to behave appropriately in the eyes of those who conduct the research, not that he really considers betas to be the most appropriate risk-measures.

In our case this should not be a serious problem. The reason is that the data for this study is from Finland where it was collected as early as in the beginning of 1984. No commercial services publishing asset betas, or asset standard deviations for that matter, were available in Finland at that time. The only institution teaching finance was the Swedish School of Economics and Business Administration which gave the first courses in finance in 1978. The CAPM did not have a prominent role in those courses. In 1983 the first students with finance as their main subject had graduated from the Swedish School of Economics.

Previously some CAPM related research had been done in Finland, however. In 1975 and 1976 Antti Korhonen published two articles in the Finnish Journal of Business in which results of a Fama & MacBeth (1973) type of test of the CAPM on Finnish data was reported. The results did not give any support for the model[1].

Thus, it seems that the evidence supports the conjecture that standard theoretical considerations could not have been very important in determining the answers on which the analysis in this paper is based.

In designing the survey our goal was to minimize the possibility of interpretation errors. Thus, we tried to keep the form as short and simple as possible. Furthermore, the survey data was collected in two steps. In order to make the respondents focus on the same phenomena we asked them to assess the riskiness of well known stocks listed on the Helsinki Stock Exchange (henceforth the HeSE). The only feasible alternative was to ask for a ranking since no absolute measure was presupposed.

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[1] This may not seem very surprising considering that only 18 stocks were included in the study.

Thus, in the first step we asked for a ranking in the order of riskiness of 15 specific stocks listed on the Helsinki Stock Exchange . The 15 stocks used in the study are listed below along with a specification of the nature of the business of the company. The questionnaire for the first step is given as questionnaire 1 in appendix 1.

The second step is more directly related to the CAPM framework. We wanted to investigate whether the basic notions of the respondents would correspond to the CAPM. This was done with reference to same 15 stocks that were used in the first step of the study. To eliminate the possibility that the questionnaire in itself would lead the respondents to associate riskiness with the basic notions in the CAPM, the questionnaire for the second step was distributed four months after the first questionnaire. This questionnaire for the second step can be found under the heading of questionnaire 2 in appendix 1.

Table 1: Stocks referred to in the survey

Stock	Nature of business in 1983
UBF, com.	banking
Pohjola	insurance
EFFOA	shipowning
Kesko	wholesale
Stockman	retail
Amer A	imports and production of consumer goods (tobacco, etc.)
Huhtamäki	production of confectionery, pharmaceutics, food, etc.
Kaukas A	pulp and paper
Kone B	machinery
Medica A	pharmaceutics
Rauma-Repola	pulp and paper and machinery
Serlachius A	pulp and paper
WSOY A	graphical industry
Wärtsilä I	shipbuilding, machinery
Yhtyneet com.	pulp and paper

The second step was more difficult than the first since the survey had to capture the basic ideas in the CAPM without explaining the model to the respondents. Our solution was to have the respondents report conditional one-year expectations based, on the one hand on an assumed bull-market, and on the other hand on an assumed bear market. Thus, we asked for two rankings of expected returns, the first ranking assuming that

the market went up by 30 % and the second ranking assuming that the market dropped by 30 %.

The questionnaire was sent to 106 investment experts in all. The total number of questionnaires that were returned and appropriately answered were 76 in the first step and 82 or 79 in the second step. In the second step three of the respondents skipped the ranking for the bear-market case. The questionnaires were sent to the same persons in both steps.

Due to the small size of the Finnish stock market the number of companies that employ professional investment experts is rather small. Furthermore, no experts from the companies whose stocks should be ranked could be accepted into the sample. In order to get a large enough sample we, thus, had to accept several experts from the same company. In fact the experts chosen can be divided into 6 separate groups: 2 from two large savings and loans banks (to be denoted as SLB1 and SLB2), 2 from two commercial banks (to be denoted as ComB1 and ComB2), one group consisting of managers (to be denoted as Managers) in larger companies not in the banking business, and finally one from insurance companies (to be denoted as Insurance).

4. The ranking based on riskiness

To begin with we wanted the respondents to report their ranking of the 15 stocks in the order of riskiness. (This was done using questionnaire 1 in appendix 1.) Note that in the questionnaire we explicitly state that we are not interested in any statistical risk measures but in how risky the respondent himself, by his own, considers the stock to be. The rank sums are reported in Table 2.

Table 2. The ranking in the order of riskiness of 15 stocks by 76 investment experts.

Stock	Rank sum	Average	St.dev.	Rank based on average
UBF, com.	1045	13.75	2.86	15
Pohjola	884	11.63	3.64	14
EFFOA	327	4.30	3.51	1
Kesko	806	10.61	3.39	12
Stockman	684	9.00	3.19	10
Amer A	596	7.84	3.51	8
Huhtamäki	728	9.58	2.92	11
Kaukas A	336	4.42	2.76	3
Kone B	812	10.68	2.88	13
Medica A	574	7.55	3.61	7
Rauma-Repola	475	6.25	3.85	5
Serlachius A	327	4.30	2.71	2
WSOY A	523	6.88	3.78	6
Wärtsilä I	617	8.12	3.58	9
Yhtyneet com.	386	5.08	3.27	4
Kendall's W		0.418		
χ^2		444.49		

Table 2 reveals that EFFOA was considered the most riskest stock whereas the common stock of the Union Bank of Finland was considered the least risky. Kendall's coefficient of concordance turned out to be as high as 0.418 with an impressive χ^2 coefficient of almost 450 under 14 degrees of freedom[2], which proves that the experts did not rank the stocks at random.

Although Table 2 shows that there is a significant correspondence in the rankings given by different individuals, it is also clear that this correpondence is not perfect. One reason for this could be heterogeneous expectations among the respondents, which would conflict with one of the basic assumptions in most of the models in financial theory. Another less controversial interpretation, however, is that the stocks are so close to each other in the risk dimension that some of the repondents determined the internal ranking of these stocks randomly. A third possiblity is that there are differences in the interpretation of the word "riskiness". Accordingly, if a common defintion could be agreed upon the ranking would be the same for each respondent.

The apparent correspondence found in the rankings could still be spurious, however. It could have been produced by an exceptionally strong artificial correspondence in some of the groups. This correspondence may have been produced by internal guide lines given by some of the banks involved. In that case the correspondence in the rest of the

[2] The critical value on a 0.5% significance level is 31.32.

groups could still have been random. To check for this possibility Kendall´s coefficient of concordance was computed for each of the groups separately. The result is reported in Table 3.

Table 3. Concordance of rankings within the groups of respondents. (The groups are explained at the end of section 3.)

	# resp.	Kendall´s W	χ^2
SLB1	19	0.331	88.09
SLB2	6	0.678	56.93
Com.B1	13	0.612	111.31
Com.B2	12	0.387	65.06
Managers	16	0.444	99.56
Insurance	10	0.706	98.83
SUM	76		

Table 3 reveals that the concordance is significant in each of the subgroups. The highest coefficient was in fact obtained for the sample picked from several insurance companies.

Given the relatively high coefficient of concordance for the whole sample and the results reported in Table 3, we would not expect any large disparities in the rankings between the groups. However, as a precautionary measure, we used Lehmann´s (1951) extension to two samples of Hoeffding´s U statistic (1948) and computed average Spearman rank correlations between each subgroup. The average coefficients are reported in Table 4, panel 1. In panel 2 we report the Z statistics obtained when estimating the variance with the method proposed by Puri and Sen (1971)[3].

[3] The whole procedure is covered in Palachek and Kerin (1982).

Table 4. Concordance of rankings between the groups of respondents.

Panel 1

Average ρ between groups

	SLB1	SLB2	Com.B1	Com.B2	Managers	Insurance
SLB1	xxxxxx					
SLB2	0.118	xxxxxx				
Com.B1	0.128	0.125	xxxxxx			
Com.B2	0.113	0.103	0.119	xxxxxx		
Managers	0.106	0.096	0.111	0.098	xxxxxx	
Insurance	0.142	0.130	0.149	0.132	0.126	xxxxxx

Panel 2

Z-values for ranking correspondence

	SLB1	SLB2	Com.B1	Com.B2	Managers	Insurance
SLB1	xxxxxx					
SLB2	4.96	xxxxxx				
Com.B1	8.17	5.29	xxxxxx			
Com.B2	4.10	3.50	4.40	xxxxxx		
Managers	4.83	3.92	5.12	3.42	xxxxxx	
Insurance	8.91	5.36	11.34	4.58	5.80	xxxxxx

Table 4 reveals that the different groups have ranked the stocks similarly. In none of the groups is the ranking clearly different from that in the rest. Together with Table 3 this table clearly indicates that our survey has succeeded in capturing an average ranking, not produced by chance alone, of stocks in the order of some notion of riskiness. This ensures the meaningfulness of the task of analyzing the correspondence of this ranking with the ranking produced by alternative risk measures a meaningful task.

5. Bull and bear market expected returns

To analyze whether the notions of risk by investment experts were consistent with the CAPM we used questionnaire 2. In the first part of that questionnaire we asked the experts to rank the same stocks as in part 1 in the order of the magnitude of the expected return conditional on a 30 % market increase. The stock with the highest

expected return was to be ranked first, the stock with the second highest return was ranked second and so on. The results are reported in Table 5.

Table 5. Ranking of expected returns conditional on a 30% market increase

	Rank sum	Average	St.dev.	Rank based on average
UBF, com.	790	9.88	4.41	14
Pohjola	708	8.85	4.07	11
EFFOA	912	11.40	3.19	15
Kesko	701	8.76	4.22	10
Stockman	627	7.84	4.01	6
Amer A	507	6.34	3.49	4
Huhtamäki	424	5.30	3.68	1
Kaukas A	666	8.33	4.26	8
Kone B	442	5.53	4.13	2
Medica A	560	7.00	4.44	5
Rauma-Repola	628	7.85	4.28	7
Serlachius A	732	9.15	3.99	12
WSOY A	740	9.25	3.75	13
Wärtsilä I	496	6.20	4.23	3
Yhtyneet com.	667	8.34	4.01	9
Kendall's W		0.055		
χ^2		62.43		

The stock which was believed to increase most in price was Huhtamäki, whereas EFFOA was believed to experience the smallest increase in price. As can be seen the correspondence is much smaller than when the respondents were asked to rank the stocks in order of riskiness. Still, the χ^2 coefficient is highly significant, which indicates that a common opinion is not completely absent.

In the second part of questionnaire 2 we asked the experts to rank the same stocks in the order of the magnitude of the expected return conditional on a 30 % market drop. The stock with the lowest expected return was to be ranked first, the stock with the second lowest return was ranked second and so on. The results are reported in Table 6.

Table 6. Ranking of expected returns conditional on a 30% drop in the market

	Rank sum	Average	St.dev.	Rank based on average
UBF, com.	785	10.19	4.90	15
Pohjola	728	9.45	4.34	13
EFFOA	457	5.94	3.86	2
Kesko	630	8.18	4.22	9
Stockman	621	8.06	3.86	8
Amer A	715	9.29	3.90	11
Huhtamäki	720	9.35	3.87	12
Kaukas A	467	6.06	3.89	3
Kone B	742	9.64	4.12	14
Medica A	685	8.90	4.33	10
Rauma-Repola	561	7.29	4.54	5
Serlachius A	455	5.91	3.88	1
WSOY A	585	7.60	3.27	6
Wärtsilä I	586	7.61	4.17	7
Yhtyneet com.	503	6.53	4.34	4
Kendall's W		0.105		
χ^2		112.75		

Serlachius A was expected to be the strongest loser in a bear market, whereas the smallest expected loss would be suffered by UBFs common stock. The ranking in the event of a market drop turned out to produce less disagreement than the ranking in the event of a market increase. The comparison between the ranking in the bull market and the bear market case did not, however, give any support for the CAPM. The constant covariance between a particular stock and the market assumed by the CAPM implies that those stocks which are assumed to go up the most if the market goes up should go down the most if the market goes down. Ideally we would observe a correlation coefficient of 1 between bull and bear market rankings. Surprisingly, the average Spearman's rank correlation coefficient turned out to be negative, the approximate value being -0.245 with a t value of -3.68[4].

When the correlation matrix for average ranks or rank sums including the first step and the two rankings from the second step was computed the figures reported in Table 7 were obtained.

[4]The design of the questionnaire makes it easier for the respondent to produce a perfect positive correlation. The same ranking for the bull and the bear market case would produce a perfect positive correlation.

Table 7. Correlation matrix for the average ranks produced by the riskiness ranking from the first step and the bull and bear rankings from the second step of our analysis.
* - significant at the 5 % level
** - significant at the 1 % level
*** - significant at the 0.05 % level[5]

	Perceived risk	Bull market return	Bear market
	Average rank	Average rank	Average rank
Riskiness rank	1.00		
Bull rank	-0.22	1.00	
Bear rank	0.90***	-0.45*	1.00

The correlation matrix reveals the striking fact that the correlation between the perceived riskiness and the bear market ranking is as high as .90. This seems to support the conjecture that the risk that matters is strongly related to the expected behaviour of the stock in the case of a general drop in the market. As opposed to the negative correlation between bull and bear market rankings this finding clearly supports the CAPM. The risk that matters is the risk that the stock price drops during a considerable drop in the market. The conjecture made in Berglund and Wahlroos (1983), further discussed in Berglund (1986), that firm size may be regarded as a proxy for the expected co-kurtosis, i.e. the risk that the stock will drop considerably when the market falls considerably, thus receives support.

6. The relation between perceived and measured risk

The following step was to investigate to what extent the rankings did correspond to return characteristics computed using historical data. When choosing the period from which to compute the estimates we faced the difficult trade-off between more data points, i.e. a longer time period, and higher degree of homogeneity between the data points, i.e. a shorter time period. Our solution was to use a period of 5 years, corresponding to the commonly used time period for beta estimation using monthly data.

The correlation matrices for the most important return characteristics are reported in Table 8.

[5]Please note that the significance levels are based on an assumption of bivariate normality.

Table 8. Correlation matrices for the most important characteristics of logarithmic returns computed on a five year time series of returns for the stocks included in the survey. Estimation period: 1978-1982, 15 stocks.

* - significant at the 5 % level
** - significant at the 1 % level
*** - significant at the 0.05 % level

	Beta equ.w.	Beta mar.w.	Mean ret.	St.dev.
Beta equally weighted	1.00			
Beta market value weighted	0.76**	1.00		
Mean ret.	0.44	0.52*	1.00	
St.dev.	0.07	-0.18	-0.01	1.00

Table 8 reveals that there is a positive relationship between mean returns and estimated betas. Furthermore, there is no relationship at all between the return standard deviation and mean returns. It is also interesting to note that the correlation between betas estimated on an equally weighted index and betas estimated on a market value weighted index is not as strong as one would expect[6]. A possible reason for this is that no large price fluctuations were observed on the HeSE during the estimation period[7]. A graph of the average price development on the HeSE from 1977 to the end of 1983 is given in Appendix 2.

Next, we turn to the relationship between the above risk measures and the rank sums obtained in our surveys. Since the respondents in the first step were asked to rank the stocks in order of decreasing riskiness, we would expect the correlation between the rank sums and any particular risk measure to be negative. On the basis of the CAPM the same sign is expected for the bull market and the bear market rankings. In both cases the stock with the highest presumed beta, i.e. the one which would increase or decrease most in price, was given the rank no. 1. The results are reported in Table 9.

[6] Somewhat above 50 % of the cross-sectional variation in one is explained by the other.

[7] Note that none of the firms had more than 10 % of the total market value on the HeSE at the end of 1983. The 10 largest firms had a market value summing to approximately 62 % of the total market.

Table 9. The correlation between risk measures based on historical data and the rank sums or average ranks obtained in the surveys. Estimation period: 1978-1982, 15 stocks.
* - significant at the 5 % level
** - significant at the 1 % level
*** - significant at the 0.05 % level

	Beta equ.w.	Beta mar.w.	St.dev.
Riskiness rank	-0.34	0.17	-0.06
Bull rank	-0.28	-0.14	-0.41
Bear rank	-0.32	0.01	0.26

The only risk measure which consistently gave the right sign was the beta coefficient computed on an equally weighted portfolio. However, since no significant correlation coefficients were observed we cannot verify that the riskiness of different stocks as assessed by our experts would be related to some particular simple risk measure computed from actual data.

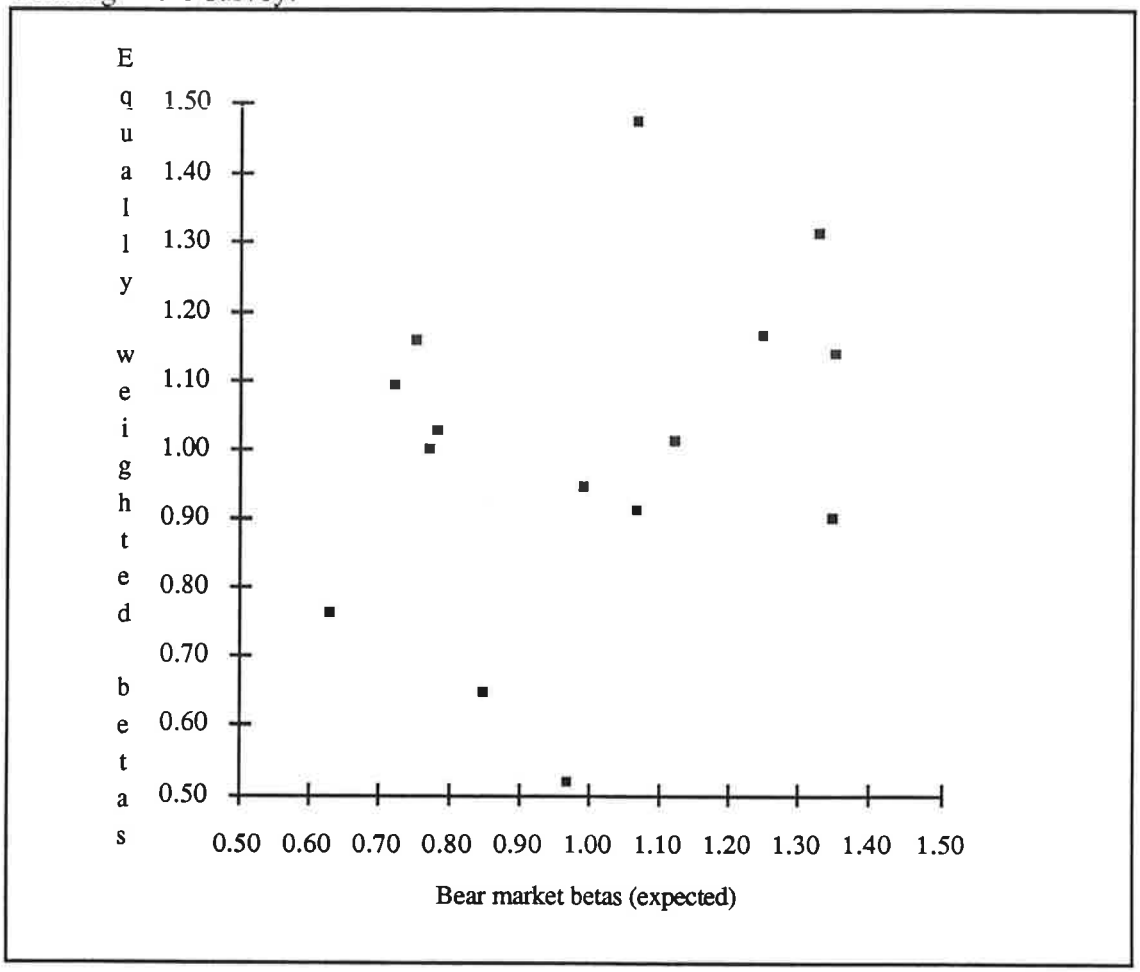
To highlight the relationship between betas computed against an equally weighted index and the results from the survey, betas based on the bear market ranking were computed for each of the stocks. The following linear transformation of the rank sums was used:

$$(3) \qquad \beta_i^{bem} = 1 - \sigma_{\beta ew} \frac{RS_i - \overline{RS}}{\sigma_{RS}} ,$$

where the superscript bem denotes bear market, the subscript i denotes the i:th (1=1...15) stock in the survey, σ is the standard deviation, the subscript ßew denotes betas computed against an equally weighted market return, and finally RS is the rank sum. In other words, the transformation assumes that the average of the betas is equal to one[8] and the dispersion the same as that for the estimated ß:s against the equally weighted market return. Figure 1 gives the plot of the measured equally weighted betas against these "bear market" betas.

[8] This is approximately the same as the average for the equally weighted betas (1.004) of the stocks in our sample.

Figure 1. Betas based on an equally weighted market return plotted against betas computed using expression (3) from the rank sums obtained in the bear market return-ranking in the survey.



7. Firm size as a proxy for risk

Next, we turn our attention to the well known "small firm effect", i.e. that over a longer time horizon small firms tend to produce a higher return then large firms. This phenomenon was first documented for the U.S. by Banz (1981) and Reinganum (1981). Later on the same phenomenon has been documented for a number of other countries as well[9]. For the HeSE in Finland the phenomenon is documented in Wahlroos and Berglund (1986) and in Berglund (1986).

[9] See e.g. Keim (1988) who documents a small firm effect for Australia, Canada, Japan and the United Kingdom on data starting in the fifties (1966 for Japan) and ending in the beginning of the eighties .

According to Roll (1981) :"...most scholars and practitioners realized that the strong and persistent difference in average return probably meant that the risk measures were incomplete...". Although attempts to correct for mechanical estimation biases in the measured betas have proved largely unsuccessful in producing new risk estimates that would dominate firm size in explaining cross-sectional differences in stock returns, see e.g. Reinganum (1982), Roll´s (1981) conjecture taken generally probably still has the most adherents among candidates for a plausible explanation. Thus e.g. Barry and Brown (1984 a,b) suggest that statistical risk measures, especially betas, tend to be more downward biased for firms on which less information is available than for firms for which information is abundant. They show (1984b) that one period ahead CAPM residuals computed using a method proposed by Brown, Durbin and Evans (1975) are more strongly correlated with the market return for small firm stocks than for large firm stocks. In other words the market risk for small firm stocks tends to be underestimated by betas.

Our data has the advantage that it allows us to perform a direct test of a possible relationship between perceived risk and firm size. Since larger size would imply lower risk we would expect a positive correlation between the log of the capitalization of the firm at the end of 1983 and the average rank of perceived riskiness. The results of this test are reported in Table 10.

Table 10. The correlation between the log of capitalization of the firm at the end of 1983 and the rank sums or average ranks obtained in the surveys.
* - significant at the 5 % level
** - significant at the 1 % level
*** - significant at the 0.05 % level

	Perceived risk Average rank	Bull market return Average rank	Bear market return Average rank
Size	0.66**	-0.28	0.55*

Interestingly enough there is a clear relationship between perceived risk and firm size as well as between the bear market ranking and firm size. This result supports Roll´s conjecture that practitioners regard smaller firms as risker. Furthermore it seems that they are regarded as risker because they are more likely to experience a large drop if the market drops.

This finding also gives additional support for the Haugen and Lakonishok (1988) portfolio rebalancing hypothesis as an explanation for the Turn-of-the-Year effect. According to Haugen and Lakonishok (1988) professional portfolio managers engage in window dressing prior to the turn of the year. They are selling off stocks which, as Ritter and Chopra (1989) describe it, "might be embarrassing if they appeared on the year-end balance sheet." Ritter and Chopra (1989) find stronger support for this hypothesis using US data than for the competing explanations based either on tax-loss selling or a January seasonal in the risk-return relationship[10].

The results in this paper reveal that investment experts regard small firms as risker than large firm stocks. Furthermore, small firms stocks are believed to drop more if the market drops. Assuming that those who supervise professional portfolio managers hold views which are similar to those held by the experts in this study the portfolio managers have an incentive to avoid the impression of gambling with the owners money by having to document a holding in small firm stocks[11]. Thus it seems to be a sensible strategy to eliminate small firm stocks from the portfolio at year-end and include them again in the beginning of the following year if they seem to be undervalued.

8. The E/P ratio, risk and conditional expected returns

Firm size is not the only variable that has been found to correlate positively with cross sectional differences in returns on U.S.-data. As early as 1977 Basu found that firms with a high E/P ratio out performed firms with a low E/P ratio. In the subsequent literature, e.g. Reinganum (1981), it has been argued that this anomaly is in fact dominated by the small firm anomaly. Basu (1983) on the other hand reaches the opposite conclusion, i.e. the E/P effect dominates the size effect when both variables are considered. Banz and Breen (1986) attribute this finding mainly to what they call a look-ahead bias, i.e. the use of earnings-figures that have not been available to investors in the beginning of the year.

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[10] For the Finnish case support for the portfolio rebalancing hypothesis can be found in the graphs given in Wahlroos and Berglund (1986). These graphs clearly reveal that prices of large firm stocks on an average experience their strongest increase in December, whereas the prices of small firm stocks fall all through December to start rising in the beginning of January.

[11] The results reported by Jaffe, Keim and Westerfield (1989) in fact point in the same direction. They show that firms with negative earnings perform better than stocks with positive earnings. A firm with negative earnings will probably be more prone to a disaster if the market drops than a firm with positive earnings. Thus responsible portfolio managers may shun stocks like that.

In a more extensive study covering 1935-1986 Jaffe, Keim and Westerfield (1989) are careful to correct for the look-ahead bias as well as the ex post-selection bias. They reach the conclusion that the small firm effect can be found in January returns over the whole period as well as in two subperiods when the data is divided into pre- and post-1968 periods. For the non-January months the size effect is insignificant. As for the E/P effect in the second subperiod, it is significant in January as well in the rest of the year for the whole period and . In the first subperiod it is significant only in January. Jaffe, Keim and Westerfield (1989) conclude that there exists an E/P effect independent of the size effect. This is supported by their observation that firms with negative earnings tend to be even stronger winners than firms with low E/Ps.

As in the case of firm size the E/P ratio may be a proxy for risk that investors are willing to accept only at a premium[12]. Assuming constant expected earnings for all firms in the future the following relationship holds as an approximation:

$$r_i = \frac{E_i}{P_i}, \tag{4}$$

where r_i is the required pre-tax rate of return for this stock, P_i the price of the stock for the i:th firm, and E_i its expected earnings. A higher required rate of return would reflect higher perceived risk according to the CAPM.

In Table 11 the relationship between the size variable and some other variables measuring the risk of the firm are reported. What is especially important in the table is the second to the last row reporting the correlation between the average E/P variable and the size variable. Although the relationship between this variable and firm size is positive for the fiscal years 1982 and 1983 it is apparent that there is no systematic relationship between firm size and the E/P variable in the present sample.

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[12] This argument is given in Ball (1978) as an interpretation of the results obtained on US-data on the relation between returns and the E/P-variable, results which are extensively surveyed in the same article.

Table 11. The correlation between firm size and the other variables included in the study.
* - significant at the 5 % level
** - significant at the 1 % level
*** - significant at the 0.05 % level

Variable		ln(Size)
Beta equ.w.		0.25
Beta mar.w.		0.53*
Mean ret.		0.40
St.dev.		-0.16
Earnings/share		
	1980	-0.38
	1981	0.11
	1982	0.33
	1983	0.27
Price/share		
	1980	-0.44
	1981	-0.41
	1982	-0.47*
	1983	-0.35
E/P		
	1980	-0.41
	1981	0.09
	1982	0.32
	1983	0.26
Avg E/P 80-83		0.11
Avg. growth of E/P 80-83		0.52*

Another interesting feature in the table is the negative correlation between the price of the stock and the logarithm of firm size. This is exactly the opposite of what has been discovered for U.S. data, by e.g. Stoll and Whaley (1983) and Blume and Stambaugh (1983). The negative correlation between P and size, however, eliminates difficulties in trying to separate a possible price-effect from the size effect.

The last row in Table 10, finally reveals that there existed a tendency for the E/P ratio of large firms to increase more than for small firms in the 1980-83 period. To a certain extent this reflects the fact that small firm stocks performed better during the period as evidenced by the correlation coefficient of 0.4 between size and the average 5-year return.

The last step was to analyze the relationship between the E/P variable and the rankings obtained in our survey. According to the simple expression (4) above we would expect

a high E/P to correspond to a high degree of riskiness. However, expression (4) was based on the assumption of constant earnings. In an efficient market an expected drop in earnings per share would, other things equal, presently be reflected in a higher E/P ratio, and an expected increase in earnings would be reflected in a lower E/P ratio. On a theoretical level it is possible to separate a known decrease in future earnings from risk. In practice an expected drop in future earnings may at least partly be regarded as risk. This conclusion is supported by the fact that it seems to be difficult to produce accurate forecasts of future earnings of the firm[13].

The previous argument is based on the assumption that the stock market is approximately efficient. An alternative hypothesis would be that the experts believe the stock market to be inefficient in the sense that a high E/P or a low P/E stock is undervalued whereas a low E/P stock is overvalued. According to this alternative the high E/P stock would be considered less risky that the low E/P. The fact there was a slight negative correlation between the bull-market rankings indicate that the alternative hypothesis could be supported[14].

A positive correlation between the E/P ratio and perceived risk would imply a negative correlation between the E/P variable and the rank sum since the most riskiest stock was given rank no.1. The same sign is expected for the correlation with the bull and bear market rank sums. The undervaluation hypothesis on the other hand would imply a positive correlation between E/P and the rank sum based on riskiness as well as the rank sum based on bear market reaction, whereas the sign should be negative for the bull market ranking. Table 12 reports the correlation coefficients between the rankings and the E/P ratios along with the variables used to compute the E/P ratios.

---

[13] Liljeblom (1989), using data for the Stockholm Stock Exchange, reports that analyst´s forecasts for the longest, 9 month, horizon covered in her study are not more accurate than the forecasts provided by previous earnings. Unfortunately, comparable results for the HeSE are not available.

[14] In fact the negative correlation was obtained conditional on one hand on a 30 % increase in the market and, on the other hand, on a 30 % drop in the market. Market increases or drops of a smaller, or larger, magnitude were not covered. A sufficient condition for the conclusion that the market is considered inefficient to hold is that our results are representative in the sense that conditional returns for individual firms are monotone functions of either the increase in the market or the drop in the market.

Table 12. The correlation between earnings and price related variables and the rank sums or average ranks obtained in the surveys.
* - significant at the 5 % level
** - significant at the 1 % level
*** - significant at the 0.05 % level

		Perceived risk Average rank	Bull market return Average rank	Bear market return Average rank
Earnings/share	1980	-0.58*	0.17	-0.61**
	1981	0.09	-0.03	0.13
	1982	0.54*	-0.43	0.56*
	1983	0.27	-0.55*	0.25
Price/share	1980	-0.66**	0.34	-0.73**
	1981	-0.71**	0.33	-0.76**
	1982	-0.66**	0.31	-0.68**
	1983	-0.52*	0.14	-0.54*
E/P	1980	-0.21	-0.01	-0.20
	1981	0.29	-0.29	0.43
	1982	0.65**	-0.39	0.58*
	1983	0.49*	-0.46*	0.40
Avg E/P	80-83	0.44	-0.39	0.46*
Avg growth of E/P	80-83	0.51*	-0.31	0.44

Table 12 supports the undervaluation hypothesis, i.e. high E/P stocks are considered less risky, they are expected to rise more in the case of a bull market and they are expected to fall less in bear market. This observation adds to the conclusion that the negative correlation between bull market and bear market rankings imply that the experts consider themselves able to judge that some stocks are undervalued and some stocks are overvalued by the market. On the basis of our last results it seems that the experts base their judgements on E/P ratios at least to some extent. High E/P-stocks are considered undervalued whereas low E/P-stocks are regarded as overvalued.

9. Summary

In this study we set out to investigate the properties of risk rankings given by investment experts. Two questionnaires were sent to 106 Finnish investment experts. In the first questionnaire, which was sent in January 1984 the experts were asked to rank 15 stocks for different listed companies in the order of perceived riskiness. In the second questionnaire, which was sent in May of the same year, the experts were asked to rank the stocks in the order of expected returns separately in the case of a market increase of 30 % (bull market) and a market decrease of 30 % (bear market). A

minimum of 76 experts (the first questionnaire) returned the questionnaires properly answered.

Several interesting things could be concluded on the basis of the answers. First of all it was apparent that some agreement was present in the risk rankings between the experts. Agreement was also present, although less apparent, in the bull and bear market case, the lowest degree of agreement occurring in the bull market case.

Contrary to what would be expected under the CAPM, the correlation between the bull and bear market rankings turned out be negative, i.e. stocks that were expected to go up most in the case of a market increase were expected to fall the least in the case of a market drop. This indicates that the experts on an average viewed the market as inefficient, there being undervalued stocks which were expected to outperform the market independent of whether the market would go up or down.

However, not all aspects in the experts´ subjective rankings turned out to be as out of line with accepted theory as this one. The assessed riskiness was observed to correlate strongly with the rank of the price drop for the stock in the case of a general drop in the market. In other words the stocks that were considered to be especially risky were stocks that were expected to experience the strongest drop in the case of a general drop in the market.

When the rankings given by the experts were compared to different risk measures estimated on monthly returns for a 5-year period ending 1983, it turned out that neither betas nor standard deviations were significantly related to the risk assessments. Only in the case of betas computed against returns of an equally weighted index did the results correspond to expectations.

A more interesting result was obtained when the rankings were compared to the firm size. A clearly significant correlation was observed, on the one hand, for the risk ranking and on the other hand for the drop in the stock price in the case of a market drop. In other words, small firms were considered risker and more exposed to a considerable drop in the market. In this sense the results clearly support the conjecture that size is an instrumental variable for risk as perceived by investors.

Finally the relationship between risk assessments and E/P ratios was examined. It turned out the results support the undervaluation hypothesis. In line with the conclusion arrived at on the basis of the negative correlation between the bull and bear

market ranking the experts apparently believe that there are undervalued and overvalued stocks. Our results indicate the grouping may at least in part, be made on the basis of E/P ratios.

Summarizing, it seems that the investment experts included in the survey regard the market as inefficient. They apparently believe that they are able to pick stocks which are undervalued. To some extent the degree of perceived undervaluation seems related to the E/P ratio for the stock. As for perceived riskiness of different stocks there exists a clear concordance between experts. The perceived riskiness of a particular stock is strongly related to how this stock is expected to perform in response to a drop in the market. Furthermore the results are consistent with firm size being a proxy for this risk.

APPENDIX 1: The questionnaires

These two questionnaires were distributed in December 1983 and April 1984 respectively. They were distributed in Finnish or Swedish depending on the preferences of the respondent. Specific pains were taken to ensure that the Swedish and the Finnish version would be equal. The English translation given below was not used to collect any data.

Questionnaire 1:

The concept of "risk": In this questionnaire "risk" is not used to denote any statistical measure of dispersion, it is rather used to denote any such form of uncertainty that may affect the value of the stock during the next five years.

Please rank the following listed stocks from 1 to 15 according to your own view of the future riskiness of this particular stock.

Encircle a number for each of the stocks so that the stock which in your opinion is riskiest gets no. 1, the next no. 2, and so on.

	riskiest														least risky
UBF, com.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Pohjola	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
EFFOA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Kesko	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Stockman	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Amer A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Huhtamäki	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Kaukas A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Kone B	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Medica A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Rauma-Repola	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Serlachius A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
WSOY A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Wärtsilä I	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Yhtyneet com.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Thank You

Questionnaire 2:

Please rank the following listed stocks from 1 to 15 according to your own view of how you expect the prices of the stocks to change in response to those changes in the market index which are specified below.

a) Encircle a number for each of the stocks so that the stock which in your opinion will experience the highest increase in price in response to a 30 % increase in the market-index will get no. 1 and the one with the smallest increase will get no. 15.

	largest increase														smallest increase
UBF, com.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Pohjola	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
EFFOA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Kesko	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Stockman	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Amer A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Huhtamäki	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Kaukas A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Kone B	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Medica A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Rauma-Repola	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Serlachius A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
WSOY A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Wärtsilä I	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Yhtyneet com.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Note: To facilitate the processing of the answers we kindly ask you to assign a different number to each of the stocks. If you belive two (or more than two) stocks to perform equally well we kindly ask you to determine an internal ranking randomly.

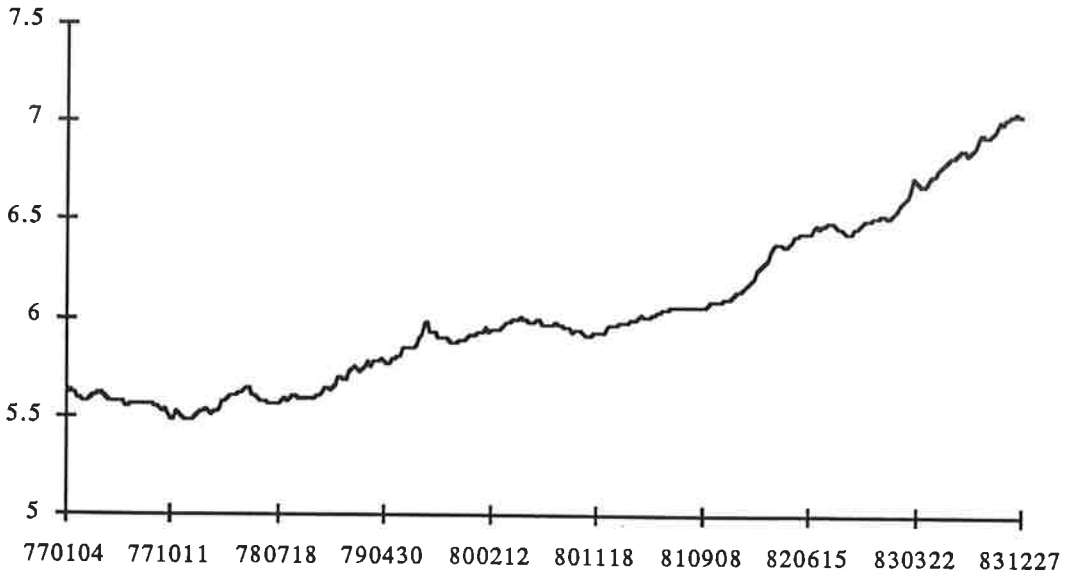
b) Encircle a number for each of the stocks so that the stock which in your opinion will experience the largest drop in price in response to a 30 % drop in the market-index will get no. 1 and the one with the smallest drop will get no. 15.

	largest drop														smallest drop
UBF, com.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Pohjola	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
EFFOA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Kesko	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Stockman	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Amer A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Huhtamäki	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Kaukas A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Kone B	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Medica A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Rauma-Repola	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Serlachius A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
WSOY A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Wärtsilä I	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Yhtyneet com.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Thank You

APPENDIX 2: Average stock price development on the Helsinki Stock Exchange during the 7 years preceding the study.

Figure: The natural logarithm of the value-weighted market index from the beginning of 1977 to the end of 1983.



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0033A/30.10.1989