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An analysis of the financial risk of Dutch agricultural cooperatives

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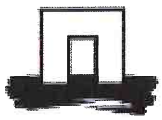

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Acknowledgements

This major thesis is part of my MSc. study Management, Economics and Consumer Studies at Wageningen University. The major thesis is conducted within the Business Economics group. This paper focuses on the analysis of the financial risk of Dutch agricultural cooperatives. These cooperatives are valued to their potential risk compared to the Dutch economy. Thereafter different clusters are established based on their risk and performance. I enjoyed the time working on this thesis and this research gave me the opportunity to better understand the risk exposure of cooperatives. I was able to combine my interests in risk and finance with the business sector. I hope that this research provides insights and knowledge about the risk of an investment in a cooperative firm.

I would like to thank the Servicedesk of cooperatives and the Euronext Amsterdam which provided me the annual reports of their firm. For making use of a database with financial variables I would like to thank Jamal Roskam, this dataset was essential for my research. Finally I would especially like to thank Prof. Dr. Ir. A.G.J.M. Oude Lansink for providing me the subject, his insights and the critical feedback regarding to the research. Besides, I would like to thank Prof. Dr. Ir. A.G.J.M. Oude Lansink for the regular appointments and the great supervision throughout the whole process.

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Summary

Cooperatives in the Dutch economy are nowadays focussed on growth, internationalisation and value-adding to survive and compete with the investor owned firms. This requires more additional equity capital. The required equity of the cooperatives can be attracted in different ways, an example is to gather equity via external investors. The different owners of the equity capital have different requirements about the expected return. Private investors value the investment to their return on the investment combined with the risk exposure. This raises the issue if an investment in a cooperative has a better or worse risk/return profile than that in an IOF (Investor Owned Firm).

The IOF's main interest is to increase the shareholders' value. As the cooperative has a double-sided goal which represents the objectives of the members on the one hand and the objectives of the cooperative firm on the other hand, this gives conflicts of interest in determining the return on equity in the cooperative firm. From previous research it appears that cooperatives function in an inherently risky business environment, because cooperatives are focussed only on one or a few raw products. Due to the fact that the cooperative has to serve its members it is vulnerable to an inflexible decision-making process which implies that the cooperative can only slightly anticipate on risk. The risk of the total cooperative business could be divided into financial and business risk. This research is zooming in on the financial risk of a cooperative, measured by the beta of a firm, compared to the market. These aspects raise the interest what the attractiveness of an investment in cooperatives will be. The amount of risk on an investment is compensated with returns on the investment, the compensation is dependent on the risk, an insight known as the portfolio theory. From fundamentals in finance is argued that risk and return are positively related to each other. The relationship is described by the capital asset pricing model.

In this paper we present and discuss the exposure of risk of Dutch agricultural cooperatives compared to the AEX-Index over a time frame of twenty years between 1993 and 2012. The attractiveness of investments in cooperatives or firms listed on the stock exchange are explained with 33 cases of agricultural cooperatives in the Dutch economy. Especially the cooperatives with a longer existence are part of this study. To check whether differences exist between cooperatives and stock exchange listed firms with activities in the food producer/processing sector, the cooperatives are compared to eleven firms listed on the stock exchange. Firms of the stock exchanges in the Netherlands, the United Kingdom, Switzerland and the United States of America are included. The AEX-Index is used as the most appropriate index to represent the Dutch market. To investigate the risk of a cooperative compared to the AEX-Index the relative returns of both are used to calculate the correlation between the two. The correlation represents the beta of the cooperatives to the AEX-Index.

The financial risk of an investment in the 33 Dutch cooperatives compared to the market is low, which is not in line with the findings of previous research. The conclusion that the financial risk of a cooperative is low is logical since the cooperative shifts the risk via the buying of the products to the farmers. In general the financial risk of the cooperatives has a beta between -0.25 and 0.25, except for the betas of CONO and CZ Rouveen with respectively a beta of 0.540 and 0.361. The cooperatives hardly follow the market, as the correlation is nearby the value of zero. From the performances it appears that 12 cooperatives perform better than the market regarding the ROE and as many as 21 cooperatives perform worse than the market based on the ROE. Which means that almost two third of the cooperatives is performing worse than the market regarding the ROE. The reverse occurs with the risk of the cooperatives, which is totally different from the market. The cooperatives CONO and CZ Rouveen carry more or less the same risk as the market. However the betas of the remaining 31 cooperatives are around zero which shows that an investment is relatively safe compared to an investment in the AEX-Index. The low risk, experienced by the cooperatives compared to the market comes at the price of lower returns to equity..

With the cluster analysis the cooperatives are grouped in three clusters. Only 31 of the 33 cooperatives are included in the cluster analysis because of outliers. The clusters are characterized by the performance based on the ROE of the cooperatives. Cluster one represents four cooperatives with a the lowest returns (these returns are lower than the market), cluster two represents twenty cooperatives which represents an average return, whereas seven cooperatives are represented by cluster three which have the highest returns (these returns are higher than the market). From these clusters it can be concluded that the majority of the cooperatives have similar returns to equity. Ten variables are used to show differences between the clusters, however no strong differences between all three clusters of cooperatives exists. That implies that the cooperatives cannot completely be grouped by other variables than the risk and return. The ten variables are unrelated to the risk and return of the cooperatives, which means that the groups cannot be predicted by variables except the risk and ROE.

A comparison of the individual cooperatives in the food producing or processing sector with a comparable IOF from the Netherlands, Switzerland, United Kingdom or the United States shows that these IOFs have a higher exposure of risk than the cooperatives. Which shows that investments in Dutch cooperatives are in general less risky than investments in the comparable firms which are listed on a stock exchange. Only the cooperatives CONO, CZ Rouveen and Fruitmasters have a similar risk to the

risk of the stock exchange listed firms. That indicates that investments in the cooperatives are qualified as safe investments with low returns to equity though compared to stock exchange listed firms.

These results suggest that investing in a hybrid cooperative is not very attractive for a profit driven investor which one is not scared for a higher exposure to risk. The financial risk is low but so are the benefits which suggest that the investment would not be part of an efficient portfolio focussed on high short-term profits. For a safety investment the investment in a cooperative would be attractive. It also implies that cooperatives that would like to attract extra equity from investors have to improve the returns on equity, which make the decision-making more difficult in the cooperative as extra profits will have to be paid by the members/farmers.

1. Introduction

1.1 Background

Nowadays changes in ownership are observed that suggest changing attitudes to cooperative thinking as they attract more equity and develop new organisational designs. Cooperatives need more equity which could be attracted in different ways, for example via external investors. Once the ownership structure changes the cooperatives are labelled as 'hybrid' cooperatives. A cooperative which is (partly) transforming to a public listed company on the stock exchange is an example of a 'hybrid' cooperative (Van Bekkum & Bijman, 2006). The 'hybrid' cooperatives exists in many forms, the transformation to a stock exchange listed company is just one of the many existing forms.

Cooperatives play a main role in the economy of the (Dutch) agriculture (van der Krogt et al., 2007; Trewin, 2004; Van Bekkum & van Dijk, 1997). The cooperatives are nowadays more focussed on growth, internationalisation and value-adding which requires more equity capital (Van Bekkum & Bijman, 2006). The ultimate manner to raise equity capital for a cooperative is the transformation to an investor owned firm (IOF), either public or private (Van Dijk & Klep, 2005; Van Bekkum & Bijman, 2006). Important differences between the cooperative and the IOF are the owner interests. Traditionally cooperatives pursue the aspect of user value as of main importance while an IOF's main interest is to increase the shareholder value (Van Dijk & Klep, 2005; Van Bekkum & Bijman, 2006). Reasoned from the difference in objective it is common sense that a cooperative will value risk in a different way than an IOF.

The risk perception of cooperatives is important when the cooperatives find a new way of existence or extension. In case a cooperative transforms to a stock exchange listed company the former members become shareholders. Cooperatives like Rabobank (the certificates of Rabobank are an obligation) and in the future probably ForFarmers are the most recent examples. In case members become shareholders the shares in firms will be valued in a different manner. Shareholders give value to shares of the former cooperative as they do with shares in other sectors (Van Dijk & Klep, 2005). An interesting issue is to measure the attractiveness of shares of cooperatives once they will be a public listed company.

Cooperatives and IOF's want to mitigate risk as much as possible, but eliminating the total risk is not feasible (Zeuli, 1999). From history, it appears that cooperatives operate in an inherently risky business environment (Manfredo & Richards, 2003). Cooperatives are generally more risky than an IOF because a purchasing cooperative is mostly focussed on one or only a few raw products, while an IOF has spread its risk among more different products (Manfredo et al., 2003). Besides that, the decision-making in cooperatives takes more time than in an IOF because of the presence of the amount of management levels. The IOF also uses more risk management tools to mitigate the total exposure of risk (Manfredo et al., 2003). From the point of view a cooperative focusses more on a single product than an IOF does, it is logical to argue that a cooperative firm is more risky than IOF's. Literature on the other hand shows a cooperative is more risk averse than private companies, caused by their double-sided decision-making (van der Krogt et al., 2007; van Dijk & Klep, 2005). Double-sided decision-making means that the management of the cooperative has to represent the objectives of the members on the one hand and the objectives of the cooperative firm on the other side.

To come up with a decision within a cooperative the members have to be convinced, in general this takes time. The decision-making within an IOF is more easy than in a cooperative because only a few people have to decide about a problem (van der Krogt et al., 2007). The easier way of decision-making makes the IOF more flexible. The decisions in an IOF is made much faster than in a cooperative, which provides an IOF a better position to anticipate on risk than a cooperative can. Risk management is divided into business risk and financial risk according to Manfredo & Richards (2003). A cooperative does have a much greater degree of business and financial risk than an IOF does (Manfredo & Richards, 2003; Parliament & Lerman, 1993). The attractiveness of an investment is dependent on the decision-maker, but the financial risk of a firm could be calculated with risk measurements. The actual risk of a firm is implemented in this research as the beta of a firm.

Questions regarding the difference in exposure of risk of a cooperative compared to the market will arise for investors. What would be more attractive to invest in, the cooperative or firms which are listed on the Dutch stock exchange. The trade-off between risk and return on equity (ROE) plays a major role in measuring the attractiveness of a firm compared to the market. The riskiness of a firm is translated to the *beta* of a firm, but what is the relation with the ROE and what is the risk compared to the market (Hillier et al., 2010). A clustering of the cooperatives in terms of their risks and return on equity could give insights in the similarities in cooperatives. Even though a part of the cooperatives have substantial changes in structure, research is only done to the forms of hybrid cooperatives and the risk management and risk management tools implemented by a cooperative (Bijman et al., 2012; Zeuli, 1999; Manfredo & Richards, 2003; Manfredo et al., 2003). None of these studies makes a comparison of the riskiness of Dutch cooperatives towards the Dutch economy (the market). Only one research focusses on the financial risk of

cooperatives, however this study is analysing the way cooperatives measure the financial risk in a province in Brazil (Mendonca & De Gregori, 2011).

1.2 Problem statement

The cooperatives have to be assessed in terms of their risk to capture the risk exposure of cooperatives. With the assessment of risk, a cooperative could be compared with the risk taken by stock exchange listed firms in the Dutch economy. The risk taken by a firm is related to the return on equity. But the questions are how these items are related in cooperatives and the trade-off compared with that of stock exchange listed companies. Is the performance from cooperatives in the similar sector the same or do the cooperatives act differently according to their policy and relation of risk towards return on equity.

Questions regarding the performance and risk attitude of a cooperative compared with a stock exchange listed company will arise. Which considerations do members or future shareholders have to make, whether they keep shares in the firm or use the equity capital for a less risky or riskier investment. The main interest of this study is to measure the attractiveness of an investment in certificates of cooperatives compared with the attractiveness of investing in shares of a stock exchange listed company in the Dutch economy. The risk of cooperatives compared to the market is an interesting topic and not many studies are done in this research area (Bijman et al., 2012; van der Krogt et al., 2007). In the literature conclusions are made about the total risk that a cooperative faces instead of focussing only on the financial risk of a cooperative (van der Krogt et al., 2007; Buccola et al., 2001; Parliament & Lerman, 1993). A comparison of the risk between different cooperatives is made often, also a comparison between cooperatives of different sectors is covered by many researches. However a comparison of the risk between Dutch cooperatives and the Dutch economy has not been done yet (Bijman et al., 2012).

1.3 Research objective

The research objective is to analyse the relation between the risk and the return on equity (efficiency) of cooperatives and of the stock exchange listed companies in the Dutch economy. To address the objective of this research, three sub-objectives are formulated:

- To analyse the relation of risk, known as the beta, towards return on equity of the particular firm;
- To compare the risk and return on equity of cooperatives, including hybrid cooperatives, with stock exchange listed companies in the Dutch economy;
- To investigate whether groups of cooperatives are similar based on their return on equity.

These sub-objectives will generate information for a description to the extent of risk carried by cooperatives compared to stock exchange listed companies in the Dutch economy.

1.4 Outline of the report

The remainder of this report is organized as follows. Chapter two is dedicated to the explanation of the different models which are used in comparing the relative risk of cooperatives with that of firms listed on the Dutch stock exchange. Besides comparing the risk, this chapter will introduce the fundamentals of the trade-off between risk and the return on stock. In the third chapter the methodology is described and this chapter includes the data set which is obtained for the study. Chapter 4 shows the empirical results, and the opportunities to cluster cooperatives by their received risk and their operating business chapter 5 shows the discussion. Finally, chapter 6 provides the conclusions.

2. Theoretical framework

This chapter gives an insight in the measurement of risk. The way in which risk and return on equity are related to each other is discussed. The first section describes the difference between systematic and unsystematic risk. Section 2.2 the trade-off between risk and return on equity will be spelt out, with findings from previous researches are set general assumptions. Finally, explained in section 2.3 is the relation of risk and return on equity.

2.1 Systematic and unsystematic risk

Financial risk and business risk forms the total scope of the risk management of a company (Manfredo & Richards, 2003). From history it appears that cooperatives are exposed to a higher risk than IOFs, partly due to the double-sided goals of a cooperative instead of the IOF with only one goal (Manfredo et al., 2003; van Dijk & Klep, 2005). The financial risk is also mentioned as the systematic risk of a company. The systematic risk has dedicated measurements, of importance are the financial figures and results. The business risk is known as the unsystematic risk and is not predictable. The business risk in a cooperative is maybe even more important than the business risk of an IOF, because the cooperative has serve the members besides only the firm itself. Business risk is difficult to measure and not clearly identifiable, which causes a factor of uncertainty in the measurements (Modigliani & Poque, 1973). The unsystematic risk is not investigated in this study to prevent the study becomes too broad. The systematic component is used for measuring the beta (Campbell & Mei, 1993; Geppert et al., 2011).

2.2 Trade-off between risk and return on equity (Portfolio theory)

The firm's risk and return on equity (i.e. performance) are positively related to each other (Wang et al., 2013; Lundblad, 2007; Ludvigson & Ng, 2006; León et al., 2006). The risk return trade-off is fundamental in finance, this was established by the model of Merton (1973), also known as the capital asset pricing model. The trade-off between risk and return on stock is a positive relationship. The positive relationship between risk and return means higher risks are compensated with higher returns and vice versa, also known as the portfolio theory (Wang et al., 2013; Christiansen, 2011). The relationship between risk and return is found to be positive in all European countries (León et al., 2006). That means that the behaviour of the Dutch stock market is in line with the theoretical fundament of Merton (1973). However conclusions from empirical research in previous research appear to be mixed and ambiguous (Ludvigson & Ng, 2006; Ghysels et al., 2005; León et al., 2006; Lundblad, 2007; Fletcher 1997). A positive relationship between risk and return is not for granted. From theoretical view it is obvious that the risk and return are positively related, but from empirical research the outcomes are inconclusive. The values of beta are shown schematically in figure 1.

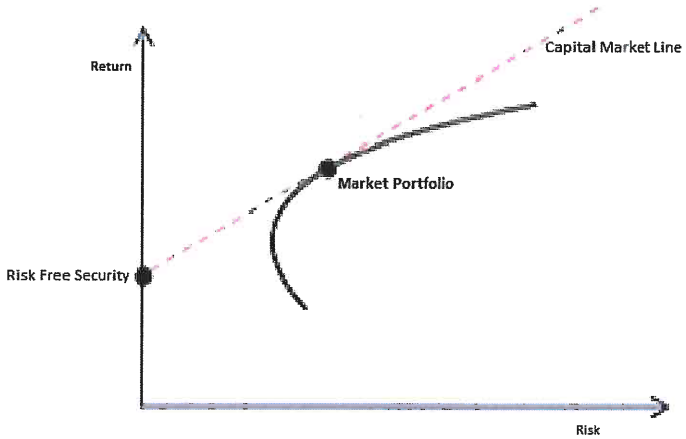


Figure 1 Portfolio theory, the efficient frontier and the market portfolio (Krotscheck, 2008)

The capital market line represents all possible combinations within a portfolio. An investment under the capital market line indicates more risk and less return compared to all combinations in a portfolio with securities. The capital market line shows the risk of a portfolio with the corresponding return on equity. A portfolio closer to the risk-free rate indicates a higher risk aversion of the investor. A point on the capital market line on the right of the market portfolio indicates that there is invested more than 100%, the beta has a value greater than 1. External capital is borrowed once the beta exceeds the value of 1 and all the invested capital is invested in a portfolio of securities. The point at the Risk-free rate (R_f) on the capital allocation line represents a beta with a value

of 0. The beta becomes greater when a security moves to the point 'Market portfolio' in figure 1, until the point 'Market portfolio' the beta is between 0 and 1. Once the security is on the point of the 'Market portfolio' the beta is represented with a value of 1[1].

Two fundamental assumptions in such research about investors are made, first: investors are rational, meaning that the investor focusses on profit maximisation (Brav et al., 2009). Second, investors are in general risk averse, following from the positive trade-off between risk and return (Wang et al., 2013; Antonides, 1990). Therefore investors demand a compensation for the risk the investors bear.

2.3 Capital Asset Pricing Model (CAPM)

Investors only bear risk when they are compensated for the risk, assuming that the risk return trade-off is a Linear relationship (Merton, 1973; Christiansen, 2011). The capital asset pricing model is a representative measurement for the linear relationship between risk and return (Andriotto & Teti, 2013; Cloininger et al., 2007; Ang & Liu, 2007). The standard formula is calculating the expected return of a security. The CAPM measures the expected return of an individual security. The expected return is positively related to the beta (Hillier et al., 2010). The formula of the CAPM is defined as:

$$R_i = R_f + \beta \times (R_m - R_f) \quad (1)$$

where R is the expected return on an individual security, R_f is representing the Risk-free rate of a security[2], the β shows the responsiveness a security has compared to movements in the market line, for the Dutch market it is represented by e.g. the AEX-Index. R_m is the return gathered on the market portfolio. The R_m-R_f represents the difference between the expected return on the market and the risk-free rate. The CAPM is a measure to calculate the beta (Hillier et al., 2010; Akono et al., 2005).

R_m-R_f is positive, because the average return on the market is in general higher than the risk-free rate. The linear relationship indicates that the two variables (risk and return on equity) cannot move independently. Once the beta has a value of zero, it implies the security has no risk at all and the expected return of the security should be equal to the risk-free rate. Meanwhile when the beta has a value of one it means the security is moving exactly the same way as the market. The following holds in this case: $R_i = R_m$. The security has the same risk as the market, and receives an equal return as on the market is provided. From rationale an investor would never invest when the beta is negative, since the investor receives more risk with lower returns than received by investing in a risk-free rate investment (Hillier et al., 2010).

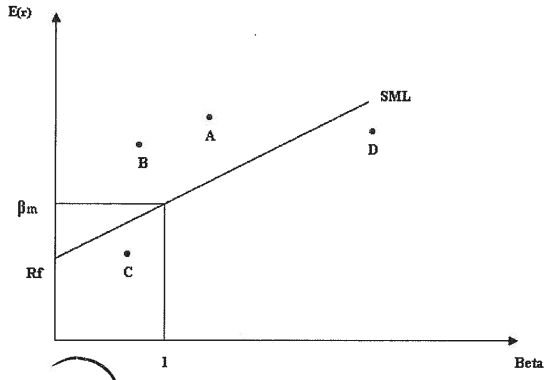


Figure 2 SML line (Globaltradecracker, 2014)

Risk aversion implies that people want to be as close as possible to the risk-free rate. The perception of each individual to risk is different (Romano, 2000). The linear relationship of risk and return is given in the CAPM formula, the relationship is represented with the part; $\beta \times (R_m - R_f)$, this part suggests that the beta is linearly related to the return on the market. Plus a given intercept in the form of the risk-free rate gives the outcome of the return on an particular security. When a beta is lower than 1 the formula shows that the return on a security will become lower than received at the market and vice versa. From fundamentals in finance it is concluded that return on a security is based on the risk of an individual security (Lundblad, 2007; Ludvigson & Ng, 2006).

[1] The dynamic in the changes in risk and expected returns show the positive trade-off between risk and return. To estimate the return of an individual security the following relationship holds (Shalit, Yitzhaki, 2002; Wang et al., 2013):

$R_i = \alpha_i + \beta_i R_m + \varepsilon_i$

where β_i represents the slope of the security compared to the market, it represents the linear predictor. The α_i represents the constant in the formula. The ε_i is the error term (unsystematic risk) of an individual security in the formula, which is assumed to be zero. The R_m is representing the ROE of the market. The R_i, representing the ROE of a security, is calculated.

[2] The risk-free rate is set at 2.47%, derived from the interest rate of the Euribor. The USA and Australia have respectively risk-free rates of 6.08% and 5.29&% (Global Tradecracker Pvt. Ltd. 2014).

The security could be represented as a point on the security market line (SML). The SML reflects the relationship between the return of a security and the beta of the security (Hillier et al., 2010). A limitation of the CAPM is that only common stock is included, but it should also incorporate bonds, real estate and commodities to represent the market portfolio (Andriotto & Teti, 2013). In this research this limitation is omitted because it does not or hardly influence the results. Where securities on the SML represents a good valued security. Whereas the securities A and B in figure 2 represents undervalued securities and the securities C and D in figure 2 are overvalued securities.

3. Methodology and data

Chapter 3 shows the methodology used in the study followed by the way the data are gathered for the research. The first section describes how the beta coefficient is derived and the way the beta efficient has to be interpreted. Section 3.2 describes the calculation of the return on equity for the different firms. In the final section 3.3 is explained how the datasets are collected.

3.1 Beta coefficient

In literature the definitions used for risk vary a lot. The formulation of a definition used in this project is as follows: '*Risk refers to uncertain consequences*' (Andretta, 2013). In this research around 35 cooperatives in the Dutch agriculture will be assessed on their relative risk compared to the Dutch market. The Dutch stock exchanges represents in this case the Dutch market. In the Dutch economy three different indices of stock exchanges exist, the AEX-Index, the AMX-Index and the AScX-Index. Most information is available for the AEX-Index and with a lesser extent the AMX-index. The AScX-Index is relatively young (since 2005) and only little information is available. The listed companies on the AEX-Index are especially internationally focussed, and have international operations. The AMX-Index includes 25 companies which have less operations or are smaller than the companies listed on the AEX-Index, the AMX-Index exists since 1995. The 35 agricultural cooperatives located in the Netherlands are mainly focussed on the Dutch market with some exceptions of firms that have international activities. The AMX-Index of the Dutch economy would be most representative for the 35 cooperatives, but a disadvantage of the AMX-Index is that the index did not exist before 1995. For this research a time period of 20 years is needed, at least. For the reason of the longer existence of the AEX-Index, the AEX-Index will be the most appropriate for the research. To compare a Dutch cooperative with the AEX-Index the risk of a firm is expressed in a '*beta*' (β). The *beta* of the AEX-Index is the basis, that means the beta is 1 (Hillier et al., 2010). The beta of Dutch cooperatives has to be compared to the Dutch capital market, represented by the AEX-index.

The relative return on a security is compared with the relative return on the AEX-Index to calculate the beta. By using a regression analysis in SPSS the correlation between return on equity of the security and the return on equity of the AEX-Index can be calculated (Hillier et al., 2010)[3]. The correlation is represented by coefficients which is represented with the beta of the cooperative. In SPSS a linear regression is implemented via the analysing option. In the linear regression the AEX-Index is defined as the independent variable, whereas the cooperatives are defined as the dependent variables.

The outcome of the beta estimation makes it possible to classify cooperatives into groups with normal, high and low returns on equity. The cause of the different levels of performance are investigated via the different activities of the cooperatives. At a final stage the cooperatives are compared to comparable firms which are already listed on a stock exchange, to indicate which differences exist between cooperatives and stock exchange listed firms.

3.2 Return on Equity (ROE)

The return on equity is a financial measure which measures the performance of a firm and how efficient the firm uses its equity. The outcome is presented as a percentage, which is used to compare firms. The formula is defined as:

$$Return\ on\ equity = \frac{Net\ income}{Total\ equity} \times 100\% \qquad (2)$$

The performance needed in a firm is dependent on its operating sector (Hillier et al., 2010). The ROE of the cooperatives is derived by using equation (2). The ROE of the cooperatives is measured according to the annual reports. Annual reports provide the amount of net results which gives the refinement to the net income in the formula and the total equity of the cooperative. The net results represents the income after paid the interest and taxes, available via the income statement. The balance sheet gives insight in the equity of the cooperative firm.

[3] The covariance of the security and the market is measured and divided by the variance of the AEX-Index. The variance is the variability of returns of the security (Modigliani & Pogue, 1973). The formula is defined as:

$$\beta_i = \frac{Cov(R_i, R_m)}{\sigma^2(R_m)}$$

where β_i is the beta of the security which is calculated, the $Cov(R_i, R_m)$ represents the covariance between the return of the security and the return on the market portfolio, $\sigma^2(R_m)$ shows the variance of the return on the market. Data of several years have to be available to give a representative view of the beta of the firm compared to the market.

The ROE of the AEX-Index is calculated differently than the ROE of the cooperatives. The ROE of the AEX-Index per year is calculated with two aspects, namely the change of the index in percentages over the period from 01 January until 31 December and the summation of the dividends paid out by each firm listed on the AEX-Index. The calculation is described in the following equation:

$$ROE\ AEX\ Index_{t-n} = R_{AEX,\ t-n} + R_{Div,\ t-n} \quad (3)$$

the percentage change of the AEX-Index per year is derived with the change of the closing price of period t-n divided by the closing price of t-n-1 and multiplied with 100%. The dividends of the 25 firms listed on the AEX-Index are added up and valued with their weightings on the AEX-Index. The relative change of the stock exchange points of the AEX-Index is gathered via data from the Euronext Amsterdam. The dividends per share are retrieved from the annual reports of the firms listed on the AEX-Index in that particular year. The dividends from all 25 listed firms have to be weighted as the weightings of the different firms on the AEX-Index. The two components added up gives the ROE of the AEX-Index of a particular year.

The calculation above is to measure the return of the whole AEX-Index, to measure the return of an individual stock exchange listed firm two measurements exist. The first measure is derived via the book value of the firm. The stock market value of the firm is the second measure. The ROE derived via the book value is calculated similarly to that of the cooperative. The equity of a stock exchange listed firm is represented as the 'shareholders equity', similarly is the net income of the stock exchange listed firm represented as the 'net results attributable to the shareholders'. The shareholders equity and the net results attributable to the shareholders are derived respectively from the balance sheet and the income statement represented in the annual reports of the firm. The ROE via the stock market value is measured via the stock price of the firm, derived from Euronext Amsterdam. The dividends are gathered via the annual report of the firm. The ROE of the companies, which are comparable to the cooperatives, is derived in the same way as equation (3). Because of some little differences the formula is defined as follows:

$$\text{ROE } Company_{t-n} = R_{Company,\ t-n} + R_{Div,\ t-n} \quad (4)$$

the difference between equation (3) and (4) are the dividends of the company instead of the AEX-Index and the relative change of stock price of the company is included instead of the relative change of the AEX-Index. To calculate the ROE of the publicly listed firms the stock exchange value measure is used. The stock exchange (market) value is more appropriate than the book value, because the stock exchange value is closer to the actual value of a firm (Hillier et al., 2010).

3.3 Data

In this research data from the Dutch agricultural cooperatives was derived from the data archive of the NCR (National Cooperative Board) in the Netherlands. The Dutch agricultural cooperatives active in the period from 1993-2012 are included in the study. During the surveyed period activities of 56 cooperatives are observed. A number of the current cooperatives emerged from various smaller cooperatives. Due to the short period of existence of several cooperatives, the cooperatives are pooled to the composition of more recent cooperatives. Composing the cooperatives prevents the research for errors in the regression. The cooperatives used for analysis amount to 37 cooperatives.

Four cooperatives (Agrifirm 2010, AgruniekRijnvallei, Geldermalsen, Coberco) are taken out from the dataset. Agrifirm 2010 and AgruniekRijnvallei are cooperatives which still exist, but their period of existence is too short. The cooperative Geldermalsen did only exist the first four years of the dataset, means that its duration is too short for a proper analysis. The cooperative Coberco is an outlier regarding to the return on equity, which is the reason to take out the cooperative Coberco from the analysis.

Without the four cooperatives the dataset, counts 33 cooperatives. Table 1 shows the descriptive statistics of the variables used for the analysis. The 33 cooperatives are ranked in alphabetical order and the column 'period' shows in which period the cooperative existed within the period of 1993-2012. Then six variables give information about the particular cooperative, i.e. these variables are 'return on equity', 'Return on equity of AEX in the same period', 'return on equity of the AEX during 1993-2012', 'standard deviation', 'minimum' and 'maximum'. The return on equity of the agricultural cooperative is calculated with equation (2).

For a representative figure the data of the AEX-index from 1993 until 2012 are used. The data of the AEX-Index are obtained from the Euronext Amsterdam (Yahoo finance, 2014). The data obtained are daily data, to measure the performance of the AEX-index only the yearly last days are of importance and all other days are selected out of the dataset. The yearly last days represents the closing price of the AEX-Index in each year. The relative change between the closing prices is measured to acquire the return on the AEX-Index. In the second phase the dividends paid out by the stock exchange listed companies are obtained from the annual reports (from 1993-2012) of the companies listed on the AEX-Index. The dividends are set as a relative value from the stock value. The return on equity describes the performance of the AEX-Index. Table 2 shows the data available from the AEX-Index. The Column 'ROE AEX' shows the return on equity on the AEX-Index, the 'ROE AEX' is used in the analysis. Euronext Amsterdam

provided a document with the composition and the weightings of the firms listed on the AEX-Index for each particular year (NYSE Amsterdam, 2014).

Table 1 Descriptive statistics 33 cooperatives

Cooperative	Period	ROE	ROE AEX same period	ROE AEX	Stand.dev.	Min	Max
ACM	1994 - 2001	1.87	15.19	8.96	4.34	-8.70	3.94
Aalsmeer	1993 - 2006	6.15	12.69	8.96	3.75	1.06	12.85
Agrico	1993 - 2012	3.82	8.53	8.96	6.95	-16.67	15.38
Agrifirm 2002	2002 - 2009	4.71	-0.02	8.96	7.73	-9.27	18.31
Agruniek	1993 - 2010	5.74	9.58	8.96	5.62	-1.91	18.22
AVEBE	1993 - 2012	0.75	8.53	8.96	14.65	-46.53	18.88
Boerenbond Deurne	1993 - 2012	8.02	8.53	8.96	9.15	1.16	25.13
Campina Melkunie - Campina	1993 - 2007	4.56	12.13	8.96	2.16	0.00	7.33
Cavo Latuco	1993 - 2001	3.18	18.51	8.96	1.27	1.37	5.56
Cehave, Landbouwbelang - CehaveLandbouwbelang	1993 - 2009	2.88	9.79	8.96	7.53	-20.79	11.38
CMW	1995 - 2003	6.20	10.00	8.96	2.15	1.48	9.74
CNB	1993 - 2012	7.33	8.53	8.96	6.20	-7.27	15.37
CNC	1993 - 2012	5.72	8.53	8.96	6.55	-2.22	20.93
CONO	1993 - 2012	66.81	8.53	8.96	30.86	20.20	111.06
Cooperatie ABC BA, CTA - ForFarmers Group	1993 - 2012	12.36	8.53	8.96	3.46	6.82	18.37
CRV	1998 - 2012	3.57	2.23	8.96	7.96	-20.90	13.80
CZ Rouveen	1994 - 2012	42.11	6.61	8.96	18.31	9.67	79.29
CZAV	1993 - 2012	8.17	8.53	8.96	2.75	3.69	17.65
Predecessor FCDF	1993 - 1996	4.45	24.05	8.96	3.22	0.54	7.75
DOC Kaas	1993 - 2012	9.28	8.53	8.96	17.57	-51.71	30.66
Flora, Holland - FloraHolland	1993 - 2006	5.36	12.69	8.96	2.25	2.17	10.01
FloraHolland Aalsmeer	2007 - 2012	3.53	-1.17	8.96	1.57	1.59	5.72
Friesland FCDF - Friesland Foods	1997 - 2007	13.55	7.80	8.96	6.54	6.61	29.62
FrieslandCampina	2008 - 2012	10.75	-2.27	8.96	1.83	9.12	13.76
Fruitmasters	1998 - 2012	-0.17	2.23	8.96	11.73	-37.41	12.02
Greenery - Combi	1993 - 2012	9.40	8.53	8.96	11.44	-8.96	34.12
Horticoop	2004 - 2008	7.16	-1.06	8.96	5.32	0.21	12.26
Horticoop	2009 - 2012	-1.76	10.17	8.96	2.54	-4.30	1.14
Lent	1995 - 2008	14.19	6.05	8.96	12.75	5.97	55.54
Nedato	1993 - 2012	5.63	8.53	8.96	4.69	-5.79	15.70
Rijnvallei	1993 - 2010	8.06	9.58	8.96	3.94	2.59	17.07
Suikerunie - Cosun - Royal Cosun	1993 - 2012	7.99	8.53	8.96	3.89	4.12	19.24
ZON	1993 - 2012	3.76	8.53	8.96	4.21	-5.74	11.37

Table 2 reveals that the dividend return in relative values is only a small part of the ROE of the AEX-Index. Besides the dividend return the closing prices of each year of the AEX-Index are listed. The AEX-Index has a mean of 386.12 stock exchange points. The obtained return on the AEX-Index is 8.80 % excluding the paid dividends. The dividends paid per year on the AEX-Index are in a range of 0.07 - 0.30%. The dividend paid out each year on average apparent from Bloomberg is 2.22 % (Bloomberg, 2014; BlackRock Ishares, 2014). Summing the return on the AEX-Index and the paid dividends give the total return of the stock on the AEX-Index. This gives a total return of 8.96 %. This market return in the Dutch economy of 8.96 % is in line with the findings of Fernandez, Aguirreamalloa & Linares (2013). From the research of Fernandez, Aguirreamalloa & Linares (2013) turns out that a return on equity of 8 % is required. The return of 8.96% of the AEX-Index means the return in the Dutch economy is higher than expected. Compared with the stock exchanges in the USA the dividend yield in the Netherlands is comparable, according to the figures of Bloomberg. However from the data of 1993 until 2012 received from the Euronext Amsterdam the Dutch economy performs worse than the stock exchanges in the USA with regard to the paid dividends. The stock exchanges in the USA are Dow Jones Index, NASDAQ and the S&P 500 are respectively 2.41 %, 1.45 % and 2.17 %. With the data from the Dutch agricultural cooperatives and the AEX-Index, the Dutch agricultural cooperatives will be analysed. The ROE of the cooperative is compared to the ROE of the AEX-Index during the same period.

To check whether the cooperatives have the same performance as comparable firms in the sector which are publicly listed, data of eleven publicly listed companies are gathered to show their similarities or differences in performance. The stock exchanges are divided into different groups, the agricultural cooperatives in the Dutch market are placed in the 'Food producers', 'Food processors' and 'Consumer goods' group. Eleven firms in the sector 'Food producer/processor' and 'Consumer goods' from different national and international stock exchanges are incorporated. The eleven stock exchange listed firms are selected by their sector and activities. First the Dutch firms within the sector food producer/processor and consumer goods are selected.

Table 2 Closing prices AEX-Index 1990-2013 (NYSE Amsterdam, 2014; Yahoo finance, 2014)

Year	Adj Close	Return (Change)	Cumulative change	Average per year	Dividend yield	Dividend return	ROE AEX
1992	129.71						
1993	187.99	44.93	44.93	44.93	0.25	0.13	45.06
1994	188.08	0.05	44.98	22.49	0.28	0.15	0.20
1995	220.24	17.10	62.08	20.69	0.34	0.15	17.25
1996	294.16	33.56	95.64	23.91	0.36	0.12	33.68
1997	414.61	40.95	136.59	27.32	0.45	0.11	41.06
1998	538.36	29.85	166.44	27.74	0.45	0.08	29.93
1999	671.51	24.73	191.17	27.31	0.50	0.07	24.81
2000	637.60	-5.05	186.12	23.26	0.48	0.07	-4.98
2001	506.78	-20.52	165.60	18.40	0.62	0.12	-20.39
2002	322.73	-36.32	129.28	12.93	0.59	0.18	-36.13
2003	337.65	4.62	133.91	12.17	0.49	0.14	4.77
2004	348.08	3.09	137.00	11.42	0.51	0.15	3.24
2005	436.78	25.48	162.48	12.50	0.64	0.15	25.63
2006	495.34	13.41	175.89	12.56	0.74	0.15	13.56
2007	515.77	4.12	180.01	12.00	0.92	0.18	4.30
2008	245.94	-52.32	127.69	7.98	0.75	0.30	-52.01
2009	335.33	36.35	164.04	9.65	0.60	0.18	36.52
2010	354.57	5.74	169.78	9.43	0.70	0.20	5.94
2011	312.47	-11.87	157.90	8.31	0.71	0.23	-11.65
2012	342.71	9.68	167.58	8.38	0.66	0.19	9.87
2013	401.79	17.24	184.82	8.80	0.66	0.17	17.40
Average	386.12	8.80					8.96

The Dutch firms are selected to provide a correct overview of the Dutch market. The firms in foreign countries are selected by their activities, their country and the availability of information (Coriolis, 2013). European firms are preferred above non-European firms, due to the structural differences of countries which could be very different per country. The beta, return on equity and activities from the stock exchange listed firms are compared to that of the cooperatives (Reuters, 2014[4]; van der Velde, 2014). The main characteristics of the eleven publicly listed firms are shown in table 3. The dataset of the publicly listed firms consists of financial figures about the equity and the dividends. For both, the equity and net income or dividend of the book value and the stock price, is calculated the return on equity to investigate whether there is a difference between these two. The ROE shown in table 3 is the ROE as a percentage of the stock price. Also the period and the difference with the AEX-Index is included.

Table 3 Eleven stock exchange listed companies in agriculture of food producer/processor

Company	Country	Index	Sector	Beta	ROE	Period	Av. AEX	Diff.
ACOMO	NL	AEX	Consumer Goods	0.11	27.39	1997-2012	4.65	22.73
Corbion	NL	AMX	Consumer Goods	0.63	10.77	1993-2012	8.53	2.24
Kon. Wessanen B.V.	NL	AScX	Consumer Goods	0.67	-2.85	1996-2012	6.36	-9.21
Nutreco NV	NL	AMX	Feed Processor	0.60	22.73	1998-2012	2.23	20.50
Unilever	NL	AEX	Consumer Goods	0.46	11.28	1997-2012	4.65	6.63
Dairy Crest Group	UK	FTSE250	Food Producers	0.59	16.44	1997-2012	4.65	11.79
Archer Daniels Midland	USA	NASDAQ	Consumer Goods	0.86	9.09	1995-2012	6.97	2.13
Carr's Milling Industries	UK	FTSE SC	Consumer Goods	0.32	18.84	1996-2012	6.36	12.48
Nestlé	Swiss	NESN VTX	Consumer Goods	0.65	12.25	1993-2012	8.53	3.71
Associated British Foods	UK	FTSE	Food Producers	0.52	13.39	1998-2012	2.23	11.16
Wynnstay Group	UK	FTSE AIM A-S	Food Producers	0.18	11.26	2005-2012	4.02	7.24

The focus of this research is on the cooperatives in the Netherlands, therefore one has to be careful by generalising the results of this study. Furthermore only the cooperatives active in the period of 1993-2012 are included. Besides that the cooperatives are active, only the cooperatives which exist longer than four years are included for the analysis

[4] The different webpages of 11 exchange listed firms are included from A until J

4. Results

Chapter 4 gives the outcomes of the measurements. The results are divided into 3 sub sections. Section 4.1 shows the results of the performances of the cooperatives conducted by a linear regression in SPSS. The second section 4.2 gives the results of the cluster analysis and whether other variables could be used that results in the different clusters. Section 4.3 represents the comparison between the cooperatives and the firms listed on the stock exchange within the food or consumer goods sector.

4.1 Performance of cooperatives

The correlation between the performance of the cooperatives and the AEX-Index is reported by the simple linear regression model. To give an accurate estimation of the beta a confidence interval of 95% is used within a normal distribution. The significance value to show whether the variable is significantly different from zero is $P < 0.05$. The significance value ($P < 0.05$) has a critical t-value of -2.093 for the left tail and 2.093 for the right tail (taking into account an infinite amount of degrees of freedom). The significance is calculated by the following equation to derive if the coefficient is significantly different from the market:

$$\mathrm{t-value} = \frac{\beta_i - 1}{Std.Error\ of\ coefficient} \tag{5}$$

where β_i represents the relationship of risk of an individual security compared to the market. In this case the beta has a value of 0.068, it represents the β_i in equation (1). In case of ACM the variable has 6 degrees of freedom. The corresponding critical t-value with 6 degrees of freedom is -2.4469 and 2.4469. The right t-value of the cooperative ACM is $\frac{0.068-1}{0.078} = -11.95$, which is beyond the critical 5% value of the t-value of -2.4469, the P-value drops below the 0.05 ($P < 0.05$).

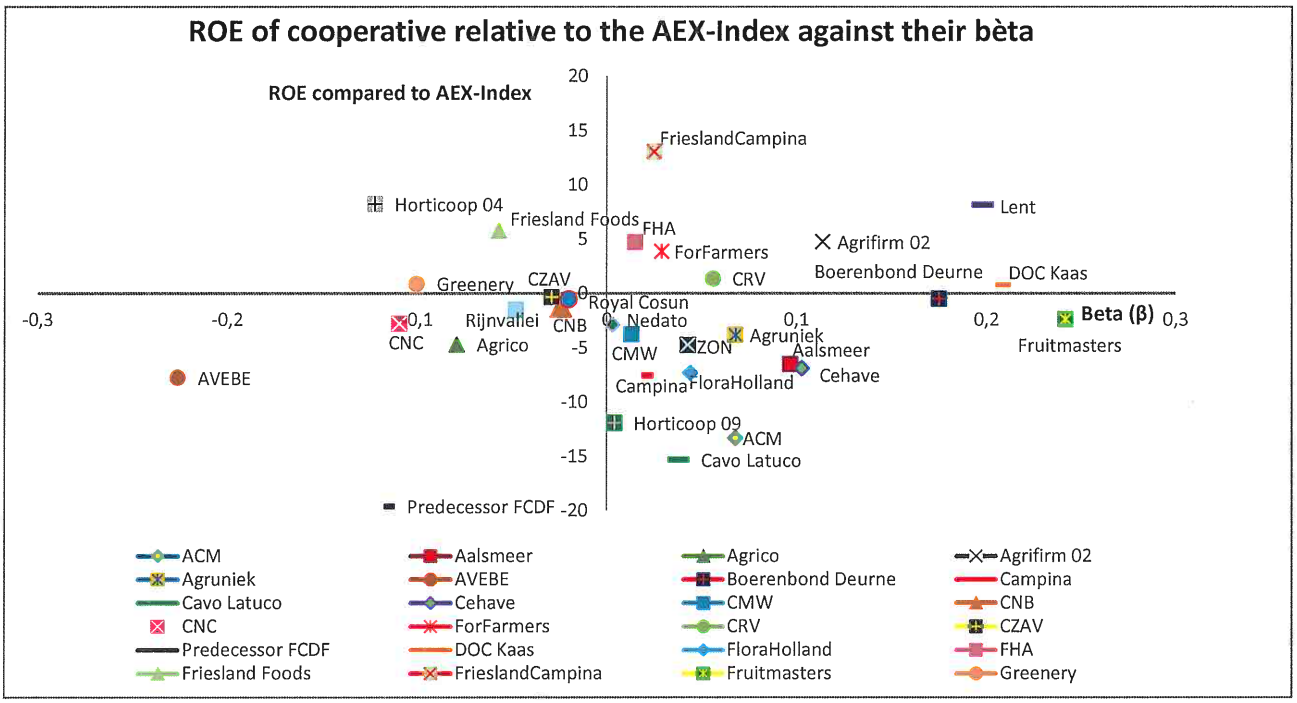
The $P < 0.05$ test concludes that ACM is significantly different from the AEX-Index, and ACM has a beta value of 0.068. Table 4 shows the beta of the cooperatives, the significance level different from the SPSS output and the significance level different from 1. In attachment I the entire table is included. Interesting from the information shown in table 4 is the result that the significance level is different from 1 for all cooperatives, 32 of the 33 betas of the cooperatives are significantly different from the market with an extraordinary low P-value. The beta of the cooperative CONO is the only exception, given the P-value of 0.092. From the significance levels in table 4 it appears that all cooperatives except CONO are significantly different from the market, whereas the hypotheses 0 (no difference between the beta of the cooperative and the market) is rejected with a critical value of 5%. A confidence interval of 99%, with a P value < 0.01, is appropriate and gives accurate results with 32 cooperatives significantly different from 1. That means that the null hypotheses of the beta of the cooperative ACM is rejected with a critical value of 0.01, which ensures a high certainty of the beta value.

The regression reveals that the beta of the cooperatives is between -0.25 and 0.25 except for the two cooperatives CONO and CZ Rouveen, with respectively a beta of 0.540 and 0.361. The 31 cooperatives with a beta between -0.25 and 0.25 track the AEX-Index with limited extent. If the AEX-Index changes with 1% the cooperatives changes with the value of their beta, represented in percentages. An example, when the ROE (including the dividends) of the AEX-Index changes with 1% the ROE of the cooperative Fruitmasters changes with 0.242% and the ROE of the cooperative AVEBE changes with -0.226%. From the regression analysis appears that nine cooperatives have a negative beta. A negative beta is strange because it could be interpreted as an investment which has a lower performance than an investment with a risk-free rate, but that is not true. It cannot be said that a cooperative with a negative beta is performing worse than a risk-free investment, it just says it moves in the opposite direction. A negative beta implies the cooperative is moving in the opposite way of the AEX-Index (Campbell & Vuolteenaho, 2004). The negative beta of the cooperative could be interpreted as a hedge fund at times when the economy has a negative performance (Cloininger et al., 2007). Downward movements of the AEX-Index causes a rise in performance of firms with a negative beta and the other way around, when the AEX-Index has an upward movement the performance of the firm with a negative beta declines (Cloininginger et al., 2007). Firms trading in futures and options markets are more likely to have a negative beta. The futures markets function as a hedge and remain stable without a huge volatility. Another aspect which influences the beta (beta becomes negative) is caused by acquisitions.

Table 4 Beta based on the real significance level

Cooperative	Bèta (β)	Sig. level diff. from 1	Sig. level diff. from 0
ACM	0,068	*0,000*	0,415
Aalsmeer	0,097	*0,000*	0,023
Agrico	-0,079	*0,000*	0,218
Agrifirm 2002	0,114	*0,000*	0,277
Agruniek	0,068	*0,000*	0,2
AVEBE	-0,226	*0,000*	0,088
Boerenbond Deurne	0,175	*0,000*	0,03
Campina Melkunie - Campina	0,019	*0,000*	0,477
Cavo Latuco	0,038	*0,000*	0,045
Cehave, Landbouwbelang - CehaveLandbouwbelang	0,103	*0,000*	0,143
CMW	0,013	*0,000*	0,675
CNB	-0,024	*0,000*	0,685
CNC	-0,109	*0,000*	0,064
CONO	0,540	*0,092*	0,051
Cooperatie ABC BA, CTA - ForFarmers Group	0,029	*0,000*	0,367
CRV	0,056	*0,000*	0,542
CZ Rouveen	0,361	*0,001*	0,037
CZAV	-0,029	*0,000*	0,258
Predecessor FCDF	-0,117	*0,005*	0,286
DOC Kaas	0,209	*0,000*	0,197
Flora, Holland - FloraHolland	0,044	*0,000*	0,099
FloraHolland Aalsmeer	0,015	*0,000*	0,594
Friesland FCDF - Friesland Foods	-0,057	*0,000*	0,557
FrieslandCampina	0,025	*0,000*	0,455
Fruitmasters	0,242	*0,000*	0,055
Greenery - Combi	-0,1	*0,000*	0,35
Horticoop 04	-0,122	*0,001*	0,201
Horticoop 09	0,004	*0,008*	0,969
Lent	0,198	*0,000*	0,136
Nedato	0,003	*0,000*	0,953
Rijnvallei	-0,048	*0,000*	0,199
Suikerunie - Cosun - Royal Cosun	-0,02	*0,000*	0,581
ZON	0,043	*0,000*	0,271

Figure 3 Beta of the cooperatives against the ROE of the AEX-Index



The cooperatives CONO and CZ Rouveen are outliers, the beta follows the market with respectively 0.54% and 0.361% when the AEX-Index changes with 1%. For analysing the results the beta and the ROE of the cooperatives compared to the AEX-Index are displayed in a scatterplot (Figure 3). The cooperatives CONO and CZ Rouveen are not included in the graph, otherwise the scatterplot will be too inaccurate. From figure 3 appears that 12 cooperatives perform better than the market in terms of their ROE, these are represented in the figure by the cooperatives which are plotted above the horizontal axes. The cooperatives which performs better than the market have a positive ROE. The other 21 cooperatives are performing worse than the market represented with a negative ROE. The 21 cooperatives are plotted below the horizontal axes. All the cooperatives have a risk which is lower than the market, as appears in figure 3. The cooperatives have a beta lower than 0.25 except for CONO and CZ Rouveen, which means it has a lower risk than the AEX-Index. A top-5 of best performing cooperatives is shown in table 5.

Table 5 Top-5 Best performing cooperatives

Cooperative	ROE - ROE AEX	Beta
CZ Rouveen	35.5	0.361
FrieslandCampina	13.02	0.025
Horticoop 04	8.22	-0.122
Lent	8.14	0.198
FrieslandFoods	5.75	-0.057

Table 6 Top-5 Worst performing cooperatives

Cooperative	ROE - ROE AEX	Beta
Predecessor FCDF	-19,6	-0,117
Cavo Latuco	-15,33	0,038
ACM	-13,32	0,068
Horticoop 09	-11,93	0,004
AVEBE	-7,78	-0,226

A fact revealed by table 5 is that the cooperatives FrieslandCampina and FrieslandFoods have a performance which is both better than the market. The cooperative FrieslandCampina originates from a merger of the cooperatives FrieslandFoods and Campina. Table 6 represents the top-5 cooperatives with the worst performance of all cooperatives with a return on equity which is far below the ROE of the AEX-Index, as well as the risk of the cooperatives. The risk of the worst performing cooperatives is quite low compared to the risk received on the AEX-Index. From table 6 follows that the predecessor of FrieslandFoods is the cooperative with the worst performance of all cooperatives while FrieslandFoods is a cooperative with one of the best performances of all cooperatives. At first sight the merger to FrieslandFoods had a positive impact. The other way around is the case of Horticoop. Before the merger in 2009 Horticoop was one of the best performing cooperatives, after the merger into Horticoop 09 the cooperative is one of the worst performing cooperatives. A rank of all cooperatives from best to worst performing cooperatives is shown in attachment II. Only 36% (12 of the 33, attachment II) of the cooperatives have a better performance than the AEX-Index based on the ROE, while an investment in 64% of the cooperatives is an inferior investment compared to the AEX-Index.

4.2 Clustering of Cooperatives

The 33 cooperatives are analysed based on their ROE and beta, to provide insight into the performance of the cooperatives, using a cluster analysis. A hierarchical cluster analysis is done, using SPSS. All 33 cooperatives are taken in the cluster analysis as variables. the amount of clusters is derived with the elbow technique, and counts three clusters. However due to two outliers only 31 cooperatives are included in the cluster analysis, further explained in the next paragraph.

The coefficients of the agglomeration schedule provided by SPSS are plotted in a line chart as shown in figure 4. Once the coefficients have a longer distance to each other than before it represents the point with the number of clusters, in other words 'the breakpoint'. The dramatic change embodies the form of an elbow. Stage 30 in figure 4 is representing the point of the dramatic change in the plot, stage 30 is included as a cluster. Figure 4 shows the dramatic change occurs after point 30, marked with the red arrow, which indicates that three clusters are used to divide the cooperatives namely stages 32, 31 and 30. However due to outliers it does not represent the clusters at best.

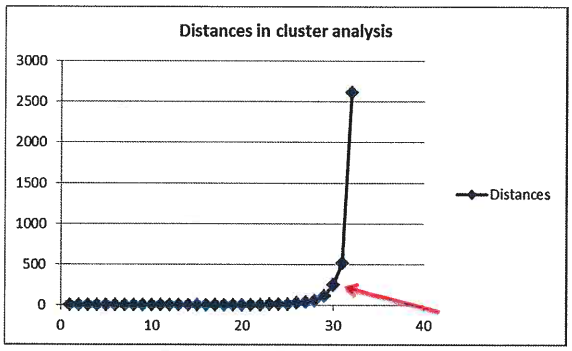


Figure 4 Scree diagram of 33 cooperatives

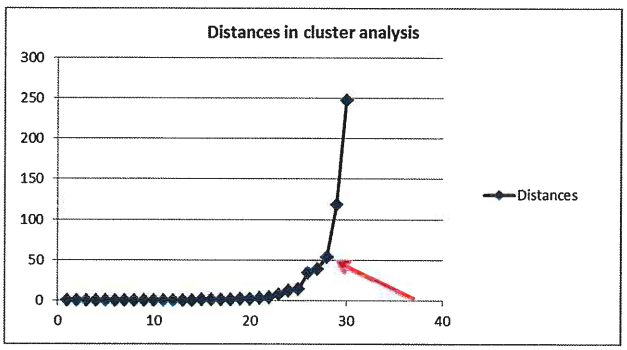


Figure 5 Scree diagram of 31 cooperatives

The cooperatives CONO and CZ Rouveen are outliers, therefor the two cooperatives are taken out of the cluster analysis. Subsequently the cluster analysis is conducted with the 31 remaining cooperatives. The scree diagram shown in figure 5 is the outcome of the cluster analysis with 31 cooperatives, the elbow technique is applied again. Three clusters arise when 31 cooperatives are included in the cluster analysis. The outcome is less obvious than shown in figure 4, but still a dramatic change in distance between the stages is observed. The graph has a misleading breakpoint at stage 25, however it is not the breakpoint. Stage 28 is the turning point, after stage 28 the distance increase dramatically. Stage 28 is included as a cluster, also marked with the red arrow in figure 5. The total number of stages is 30, on that basis the number of clusters is 30 – 27 = 3. The 31 cooperatives are divided over the three clusters. Table 7 shows the distribution of the cooperatives in the clusters.

Table 7 Cluster analysis 31 cooperatives

Cluster 1	Cluster 2	Cluster 3
ACM	Aalsmeer	Agrifirm
Cavo Latuco	Agrico	ForFarmers
Predecessor FCDF	Agruniek	FHA
Horticoop 09	AVEBE	FrieslandFoods
	Boerenbond Deurne	FrieslandCampina
	Campina	Horticoop 04
	Cehave	Lent
	CMW	
	CNB	
	CNC	
	CRV	
	CZAV	
	DOC Kaas	
	FloraHolland	
	Fruitmasters	
	Greenery	
	Nedato	
	Rijnvallei	
	Royal Cosun	
	ZON	

The cluster analysis performed on the remaining cooperatives provides a clear insight in the formation of clusters. Cluster one represents the cooperatives with the lowest return on equity, whereas cluster three is the opposite and represents the cooperatives with the highest returns on the provided capital. Cluster two group in between which represents an average in return on equity. Cluster 1 has only a few cooperatives, namely ACM, Cavo Latuco, predecessor FCDF and Horticoop 09. Cluster 2 has by far the most cooperatives, cooperatives included in cluster 2: Aalsmeer, Agrico, Agruniek, AVEBE, Boerenbond Deurne, Campina, Cehave, CMW, CNB, CNC, CRV, CZAV, FloraHolland, Nedato, Rijnvallei, Royal Cosun and ZON. Cluster 3 exists the remaining cooperatives Agrifirm, ForFarmers, FHA, FrieslandFoods, FrieslandCampina, Horticoop 04 and Lent. The clusters could be identified with comparing the cluster list with figure 3, because for example Cluster 1 is by far the cluster with the worst performing cooperatives based on the ROE. Cluster 2 has the feature that the beta of the cooperatives are around the value of zero, not far below and not far above zero. Whereas the cooperatives in cluster 1 had a ROE worse than the other cooperatives, the cooperatives in cluster three are the opposite of cluster one with the better performance given the ROE of the cooperatives compared to the other clusters. All cooperatives in cluster 3 have international activities and offices in two countries at least. The other clusters have more national oriented cooperatives, however cluster 2 has also a few cooperatives with international activities. All three clusters exists of cooperatives active in different sectors. The indicator 'sector' does not provide any significant difference between the three clusters.

In addition to the cluster analysis, ten variables are used to see whether statistically significant differences exist between the different clusters (Table 8 to 10). The different clusters are compared to each other whether significant differences exist by the different variables. The outcome is derived via the SPSS output of the independent sample t-test. Table 8 represents the comparison between the clusters 1 and 2, table 9 represents the comparison between clusters 1 and 3. Whereas table 10 shows the comparison between clusters 2 and 3. The ten variables for clustering are Debt/Equity ratio, standard deviation, amount of members, net sales, function of cooperative, sector of activities, EBIT (Earnings Before Interest and Taxes) per total assets, solvability, net return per member and (inter)national activities which are also shown in attachment III. A clear distinction between the cooperatives is not visible with comparing the clusters by the variables. However some variables show partial differences, as the net results per member (Table 9 and 10), EBIT per total assets (Table 9), sales (Table 10) and sales national or international (Table 8 and 9) do. The indicator net results per member shows cluster 3 is significantly different from cluster 1 and 2, whereas cluster 1 and 2 are not significantly different from each other. The EBIT per total assets shows only a significant difference between clusters 1 and 2. Cluster 3 is significantly different from cluster 2 in terms of the amount of sales, whereas these are the only clusters significantly different from each other. The (inter)national activities show a significant difference between cluster 1 and

the two other clusters, but like the others a significant difference between cluster 2 and 3 is missing. The other variables do not show any significant differences between the clusters. However these four variables do not show enough evidence to divide the cooperatives among the clusters. From these findings could be concluded that the clusters are affected with the ROE and the beta, but other variables do not give enough information to divide the cooperatives in different clusters.

Table 8 Comparison between clusters 1 and 2

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DEratio	Equal variances assumed	2.353	.139	-.599	22	.555	-.62550	1.04451	-2.79167	1.54067
	Equal variances not assumed			-1.196	20.248	.245	-.62550	.52285	-1.71528	.46428
Members	Equal variances assumed	.111	.743	.876	22	.391	3096.35000	3534.96987	-4234.72880	10427.42880
	Equal variances not assumed			1.127	5.908	.303	3096.35000	2747.50071	-3652.00510	9844.70510
Solvability	Equal variances assumed	2.663	.117	-.015	22	.988	-.12850	8.54629	-17.85242	17.59542
	Equal variances not assumed			-.024	9.290	.982	-.12850	5.42336	-12.33885	12.08185
EBIT_tAssets	Equal variances assumed	.019	.893	-.026	22	.979	-.47050	17.92761	-37.65009	36.70909
	Equal variances not assumed			-.040	8.559	.969	-.47050	11.72088	-27.19457	26.25357
NetR_member	Equal variances assumed	.522	.478	-1.427	22	.168	-1.00100	.70156	-2.45595	.45395
	Equal variances not assumed			-1.941	6.544	.096	-1.00100	.51569	-2.23786	.23586
Volatility	Equal variances assumed	3.020	.096	-1.779	22	.089	-3.91450	2.20011	-8.47724	.64824
	Equal variances not assumed			-3.390	17.545	.003	-3.91450	1.15479	-6.34514	-1.48386
Sector	Equal variances assumed	.388	.541	-.065	20	.949	-.083	1.289	-2.772	2.605
	Equal variances not assumed			-.055	3.840	.959	-.083	1.529	-4.399	4.232
Function	Equal variances assumed	1.495	.235	-.104	21	.918	-.039	.378	-.825	.746
	Equal variances not assumed			-.079	3.568	.941	-.039	.500	-1.497	1.418
Sales_Nat_Int	Equal variances assumed	19.250	.000	-1.254	22	.223	-.300	.239	-.796	.196
	Equal variances not assumed			-2.854	19.000	.010	-.300	.105	-.520	-.080
Sales	Equal variances assumed	.288	.597	.350	22	.730	167109.7000	477798.5024	-823783.7460	1158003.146
	Equal variances not assumed			.298	3.798	.781	167109.7000	560193.7894	-1421422.403	1755641.803

Table 9 Comparison between clusters 1 and 3

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DEratio	Equal variances assumed	.645	.443	-.180	9	.861	-.08929	.49469	-1.20835	1.02978
	Equal variances not assumed			-.211	8.970	.838	-.08929	.42405	-1.04906	.87049
Members	Equal variances assumed	1.203	.301	-.166	9	.872	-576.03571	3479.74900	-8447.77483	7295.70340
	Equal variances not assumed			-.179	7.887	.863	-576.03571	3223.94788	-8028.97388	6876.90245
Solvability	Equal variances assumed	1.041	.334	-.142	9	.890	-.93500	6.59733	-15.85919	13.98919
	Equal variances not assumed			-.158	8.469	.878	-.93500	5.91935	-14.45468	12.58468
EBIT_tAssets	Equal variances assumed	10.913	.009	.930	9	.376	6.08036	6.53522	-8.70333	20.86404
	Equal variances not assumed			.685	3.082	.542	6.08036	8.88120	-21.76139	33.92211
NetR_member	Equal variances assumed	6.552	.031	-1.652	9	.133	-4.51536	2.73288	-10.69756	1.66684
	Equal variances not assumed			-2.203	6.513	.066	-4.51536	2.04936	-9.43576	.40505
Volatility	Equal variances assumed	2.696	.135	-1.343	9	.212	-2.75750	2.05350	-7.40283	1.88783
	Equal variances not assumed			-1.712	7.917	.126	-2.75750	1.61081	-6.47884	.96384
Sector	Equal variances assumed	.068	.800	-.277	9	.788	-.464	1.674	-4.251	3.322
	Equal variances not assumed			-.268	5.756	.798	-.464	1.732	-4.747	3.819
Function	Equal variances assumed	.333	.578	-1.032	9	.329	-.536	.519	-1.711	.639
	Equal variances not assumed			-.961	5.189	.379	-.536	.557	-1.953	.882
Sales_Nat_Int	Equal variances assumed	14.545	.004	-1.144	9	.282	-.286	.250	-.851	.279
	Equal variances not assumed			-1.549	6.000	.172	-.286	.184	-.737	.166
Sales	Equal variances assumed	4.029	.076	-1.160	9	.276	-2049256.214	1765951.824	-6044116.782	1945604.353
	Equal variances not assumed			-1.487	7.779	.176	-2049256.214	1378410.821	-5243633.818	1145121.389

Table 10 Comparison between clusters 2 and 3

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DEratio	Equal variances assumed	2.376	.136	.666	25	.512	.53621	.80525	-1.12223	2.19466
	Equal variances not assumed			.943	23.299	.355	.53621	.56872	-.63943	1.71186
Members	Equal variances assumed	.172	.682	-1.280	25	.212	-3672.38571	2868.26808	-9579.69441	2234.92298
	Equal variances not assumed			-1.356	11.737	.201	-3672.38571	2707.96306	-9587.21284	2242.44141
Solvability	Equal variances assumed	1.315	.262	-.119	25	.906	-.80650	6.78843	-14.78754	13.17454
	Equal variances not assumed			-.141	15.103	.890	-.80650	5.72864	-13.00954	11.39654
EBIT_tAssets	Equal variances assumed	1.205	.283	.495	25	.625	6.55086	13.22731	-20.69129	33.79301
	Equal variances not assumed			.841	19.665	.410	6.55086	7.78660	-9.70946	22.81117
NetR_member	Equal variances assumed	22.710	.000	-2.809	25	.010	-3.51436	1.25127	-6.09139	-.93733
	Equal variances not assumed			-1.733	6.269	.132	-3.51436	2.02800	-8.42559	1.39687
Volatility	Equal variances assumed	.109	.744	.627	25	.536	1.15700	1.84586	-2.64462	4.95862
	Equal variances not assumed			.657	11.488	.524	1.15700	1.76164	-2.70034	5.01434
Sector	Equal variances assumed	.127	.725	-.369	23	.715	-.381	1.032	-2.516	1.754
	Equal variances not assumed			-.346	9.728	.737	-.381	1.101	-2.845	2.083
Function	Equal variances assumed	.489	.491	-1.690	24	.104	-.496	.294	-1.102	.110
	Equal variances not assumed			-1.550	9.268	.155	-.496	.320	-1.218	.225
Sales_Nat_Int	Equal variances assumed	.019	.890	.069	25	.946	.014	.208	-.415	.443
	Equal variances not assumed			.067	10.193	.948	.014	.212	-.458	.486
Sales	Equal variances assumed	21.724	.000	-2.795	25	.010	-2216365.914	792914.8571	-3849404.631	-583327.1969
	Equal variances not assumed			-1.722	6.263	.134	-2216365.914	1287135.845	-5334107.955	901376.1268

4.3 Cooperatives compared to similar firms listed on the stock exchange

From section 3.4 appears a list with eleven similar firms which are already listed on national and international stock exchanges. In this research firms from the stock exchanges in the Netherlands (NL), United Kingdom (UK), United States of America (USA) and Switzerland (Swiss) are included. The beta of these firms are quite high compared to the results of the betas found for the cooperatives in section 4.1. From the firms only ACOMO and Wynnstay Group are comparable to the cooperatives considering their beta. The other way around only the cooperatives CONO and CZ Rouveen are comparable with the eleven firms listed on the stock exchange due to their higher beta. The ROE of the firms are calculated with reference to their stock market value, because that gives the most relevant indication of the value of the firm (Hillier et al., 2010). Also the book value gives information about the ROE but it does not represent the real value of the firm. From a comparison between the stock market value and the book value over the eleven stock exchange listed firms appears that in general the stock market value is higher than the book value.

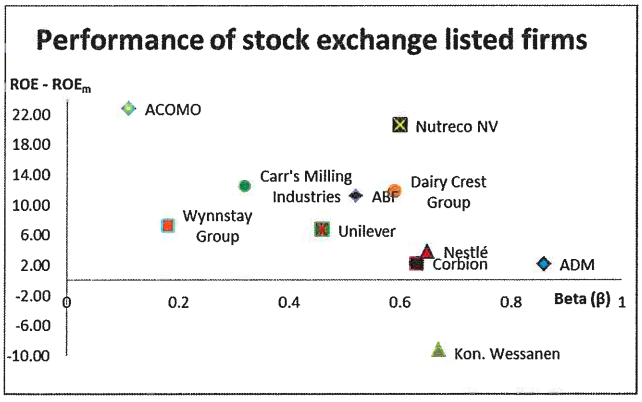


Figure 6 The performance of 11 stock exchange listed firms

An important insight regarding firms listed on the stock exchange is that the firms have a big difference in their beta even when firms operate in the same business or sector. For instance the beta of Archer Daniels Midland (0.86), Carr's Milling Industries (0.32) and ACOMO (0.11) have completely different values. This could be caused by the difference in management of the particular firm, different countries where the headquarter is located and the amount of international operations could also play a role in the different betas. One main characteristic could be observed which is that the cooperatives are in general less risky, striking that this outcome is contradicting to the findings of previous research about the riskiness of cooperatives compared to the IOF described in chapter two. than the comparable firms listed on the stock exchanges. In figure 7 is shown the performance of the stock exchange

listed firms, with two or three exceptions most firms are grouped together. Compared to figure 3 the stock exchange listed firms have a better performance than the cooperatives, they have a beta with higher expected returns compared to the market.

Figure 6 shows in a simple overview the place of the firms listed on the stock exchange. Figure 7 gives yet another overview of the firms listed on the stock exchange compared to the cooperatives. The firms listed on the stock exchange are depicted with a yellow star in a black square, to show the differences within one aspect. From the graph appears that, except for the outliers, the firms listed on the stock exchanges in general have a higher performance based on their ROE with more risk compared to the cooperatives. Almost all firms have a higher beta than the cooperatives which results in higher expected returns. A lot of cooperatives have a negative ROE, while Koninklijke Wessanen is the only stock exchange listed firm with a negative ROE. A few cooperatives have a better performance given the linear risk-return trade-off: FrieslandCampina, Lent, CONO and CZ Rouveen. These cooperatives have less risk while they have higher returns on equity. This indicates that investments in these cooperatives have a higher returns in relation to the risk than the stock exchange listed firms. Three out of these four are dairy cooperatives that work in a sector where risks on input prices (milk) are reduced by government intervention (quota).

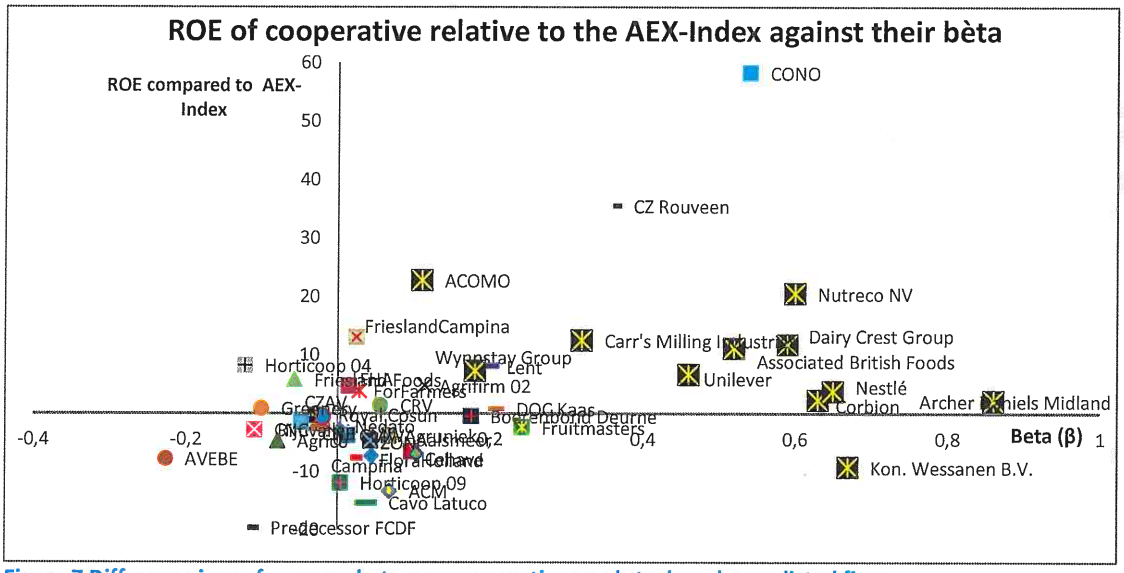


Figure 7 Difference in performance between cooperatives and stock exchange listed firms

Overall the risk and return of the stock exchange listed firms are higher than those of most cooperatives. Besides, the risk and return of the stock exchange listed firms are closer to the risk and return received on the AEX-Index than the cooperatives. The difference could be caused by the volatility of the stock market where the firms listed on the stock exchange are exposed to (Hart & Moore, 1996).

5. Discussion

This report presents an analysis of the relation between risk exposure and the performance of Dutch agricultural cooperatives compared to the Dutch market over the period 1993-2012. The discussion starts with an evaluation of the main results found in this study. The main objective of the report was to investigate the relation between risk and return of a cooperative compared with that of stock exchange listed firms in the Dutch economy.

The beta from the 32 of the 33 cooperatives are significantly different from the beta of the AEX-Index at a critical level of 1%, only CONO is not significant different from the AEX-Index. CONO is significantly different with a critical value of 10%. 31 cooperatives track the AEX-Index with a beta between -0.25 and 0.25. It means that these cooperatives react only slightly to the changes of the AEX. While the cooperatives CONO and CZ Rouveen are relatively sensitive to the AEX-Index compared with the other 31 cooperatives. The sensitivity of CONO and CZ Rouveen could be caused by a bigger part of the profits are retained to the cooperative firm instead that it flows back to the members. Which means the risk the cooperative took in the market retains in the cooperative and the members are protected of huge price fluctuations caused by the risk. The objective of the cooperative to serve the members is not taken into account, but has a major impact on the results. Because members are interested in the advantages as being a member instead of searching for high returns on their invested capital in the cooperative. The two-sided goal of the cooperatives provides a difficulty for investors/members/cooperative but also for governments how to treat the distinction between a cooperative and an IOF.

The low beta of the cooperatives compared to the AEX-Index implies that an investment is relatively safe, given the risk received on the AEX-Index. In relation with that, the returns on the investment are low, because no great risks have to be compensated. The assumption is made that the investors are rational and are focussed on profit maximisation. With that perspective it is not interesting at all to invest in a cooperative, since profit maximisation is not feasible in a cooperative firm. However the investors are not only focussed on profit maximisation and are not fully rational as assumed in this research, because emotional aspects are playing a role in the decision-making (Zacharakis & Shepherd, 2001). These assumptions influence the results because the behaviour of an investor is not taken into account. In addition it is assumed that the investors are risk averse, while in practice each investor has a different attitude to the exposure of risk. Which is not possible to take into account in this research, but it plays a main role in the decision-making of investors. For risk averse investors it is an interesting investment and could be used as a long-term investment. That makes it difficult to give an unambiguous answer to the attractiveness of an investment in a cooperative. Members are often obligated to provide equity capital in the cooperative firm, because of the obligation it is not obvious what the attitude of the member, in this case the farmer, is to the investment. They simply do not have the choice whether to invest or not.

The negative beta of nine firms is strange because at first sight it suggests the investment has less than the risk-free rate. However it means a cooperative with a negative beta moves in the opposite direction of the AEX-Index. It is a kind of hedge. It could be caused by the amount of futures and options trading by that certain cooperative. It is interesting to investigate whether these cooperatives behave as a hedge funds of the AEX-Index and if the cooperatives really trade in futures and options markets to hedge their own products, and if so, if they trade significantly more on the futures markets than the other cooperatives.

The difference in the betas of the cooperatives is caused by the different return on equity that a cooperative provides as a firm; this is influenced by the two-sided goal of a cooperative. However it is strange to give value to the return on equity with notice that the profit of a cooperative is partly paid out via higher prices for the products of the farmers as compensation for their capital insertion. The private investor would not ask this kind of matters because the investors are only interested what the return on their investment will be and how much risk they are exposed to.

It remains questionable how to calculate the ROE of cooperatives and whether it is fair to compare the ROE of cooperatives with the ROE of an IOF, because cooperatives have a double-sided goal compared to the one-sided goal of the IOFs (Soboh et al., 2012). The profits normally retained from the sales are partly paid to the members in the form of higher prices for their products. From a management perspective it is not fair to compare these kind of business forms with each other because the different business forms have totally different objectives, therefore the comparison of the business forms may be doubtful. However from the investors point of view it is not the question whether it is a fair comparison or not, the investor will just judge the investment in a hybrid cooperative on their return on equity and the exposure of risk. Where the investor is seeking for higher returns on their investment.

In this research, the ROE of the cooperatives is determined in a similar way as the ROE of the firms listed on the stock exchange, the only difference is that the calculation of the ROE of the cooperatives uses the book value and for the stock exchange listed firms the market value. That makes it difficult to value the activities of a cooperative and it is difficult to compare them with an IOF. However when the cooperatives and the stock exchange listed firms are both calculated by their book value the difference in the ROE would be even bigger. Because the equity capital is lower valuated with the book value calculation and the net results of the firm remains the same. In case the calculation of the ROE of the stock market listed companies would be on book value, the ROE of

the stock exchange listed firms would be even higher - which means a bigger difference between the ROE of the cooperative and the ROE of the stock exchange listed firms. For private investors that means it would be less attractive to invest in the cooperative and government bonds will have a higher yield than an investment in a hybrid cooperative. The book value calculation for a stock exchange listed firm would be a disadvantage in the valuation of an investment in a hybrid cooperative.

Cooperatives continuously merge and this posed a problem for the research presented here. Sometimes rather small time periods had to be used. Differences exist in betas before and after merging. Examples of these contradictions are FrieslandFoods and the predecessor FCDF, Horticoop 09 and Horticoop 04. It may be interesting to investigate what happened in cases like FrieslandFoods and Horticoop, more cases like these exists. In the transformation from FCDF to FrieslandFoods it could be logical to argue that the synergy in the merger of cooperatives caused the higher returns in the firm, this would be an interesting aspect for further research. Cooperatives which expanded by mergers and acquisitions (M&A) could affect the results and conclusions of the analysis, especially the cooperatives which had a short existence within the period of 1993-2012. The outcomes of cooperatives with a short existence (around five years) are highly influenced by the M&A which gives the effect of higher fluctuating returns among the years (van der Krogt et al., 2007). These aspects are not included in the analysis, while it would be interesting to see what the influence would be.

It appears that 3 clusters are formed on behaviour of their received return through the years. From that perspective cluster 1 includes the cooperatives with the lowest returns, cluster 2 includes the average cooperatives and cluster 3 includes the cooperatives with highest returns. It is plausible to think there is a link with other variables which predict significant differences between the three clusters. However, none of the ten variables used to show a difference is related to the ROE of the various cooperatives. Some studies argue from findings that risk is linked to the commodity handled by the cooperative, however in this research not any relation is found between the risk of a cooperative and the specific commodity handled by the cooperative (Parliament & Lerman, 1993; Lerman & Parliament, 1991; Royer, 1991). Because no relation is found in the commodity handled and the risk of a cooperative, it is concluded that the findings from Parliament and Lerman (1993) do not apply to Dutch agricultural cooperatives. The difference is probably caused by the voluntary response of the cooperatives within the agricultural sector in the USA and these cooperatives were not bargaining cooperatives, while in this research all the cooperatives within the agricultural sector in the Netherlands are included for the analysis. With the voluntary responses you do not know who responded and why just these cooperatives responded. But the conclusion could be that the link does not hold everywhere.

This research shows the position of the cooperatives in the market and the low risk profile of the cooperatives. With the outcomes of this research it is possible to give value to the strategy of cooperatives and it could be used for making new strategies within cooperatives, besides it gives an insight in the performance of cooperatives with respect to the market. The results provide the way in which cooperatives follow the market. Where previous studies argued that the cooperatives have less risk than the market, this study substantiates the arguments with numbers, which gives a strong interpretation and a quick overview about the cooperatives.

For further research it would be attractive to investigate the way in which management in a cooperative is conducted. As it appears the investment in cooperatives has a quite low risk, which could be plausible if the people in the management are restrained and cautious and have to take deliberate decisions. However the food supply chain could also be less risky than other sectors. The cause of the behaviour of the management is that they have to represent all different views within the cooperative. Because of voting rights within the cooperative it takes longer for making decisions which is also reducing risk. It would be useful to know if the management of the cooperative is adapted to realize decisions with low risk or whether the management is forced by its members, or whether they are able to shift the risk to the members/farmers. Besides these aspects it is useful to know whether the low risk exposure of cooperatives also holds for cooperatives in other sectors outside the agricultural sector and if these results holds for cooperatives in foreign countries.

6. Conclusion

This report presents an analysis of the relation between risk exposure and the performance of Dutch agricultural cooperatives compared to the Dutch market over the period 1993-2012. The main objective of the report was to investigate the relation between risk and return of a cooperative compared with that of stock exchange listed firms in the Dutch economy.

The financial risk of an investment in the 33 Dutch cooperatives compared to the market is low, which is not in line with the findings of previous research. The conclusion that the financial risk of a cooperative is low is logical following that the cooperative shifts the risk via the buying of the products to the farmers. In general the financial risk of the cooperatives has a beta between -0.25 and 0.25, except for the betas of CONO and CZ Rouveen with respectively a beta of 0.540 and 0.361. The cooperatives hardly follow the market, as the correlation is nearby the value of zero. From the performances it appears that 12 cooperatives perform better than the market regarding the ROE and as many as 21 cooperatives perform worse than the market. Which means that almost two third of the cooperatives is performing worse than the market regarding the ROE. The reverse occurs with the risk of the cooperatives, which is totally different from the market. The cooperatives CONO and CZ Rouveen carry more or less the same risk as the market. However the betas of the remaining 31 cooperatives are around zero which shows that an investment is relatively safe compared to an investment in the AEX-Index. The low risk, experienced by the cooperatives compared to the market is compensated with corresponding lower returns, which is lower than the returns on the AEX-Index.

With the cluster analysis the cooperatives are grouped in three clusters. Only 31 of the 33 cooperatives are included in the cluster analysis because of outliers. The clusters are characterized by the performance based on the ROE of the cooperatives. Cluster one represents four cooperatives with a the lowest returns (these returns are lower than the market), cluster two represents twenty cooperatives which represents an average return, whereas seven cooperatives are represented by cluster three which have the highest returns (these returns are higher than the market). From these clusters it can be concluded that the majority of all cooperatives have similar returns. Ten variables are used to show differences between the clusters, however no strong differences between all three clusters of cooperatives exists. That implies that the cooperatives cannot completely be grouped by other variables than the risk and return. The ten variables are unrelated to the risk and return of the cooperatives, which means that the groups cannot be predicted by variables except the risk and ROE.

A comparison of the individual cooperatives in the food producing or processing sector with comparable IOFs from the Netherlands, Switzerland, United Kingdom or the United States shows that these IOFs have a higher exposure to risk than the cooperatives. Which shows that investments in Dutch cooperatives are in general less risky than investments in the comparable firms which are listed on a stock exchange. Only the cooperatives CONO, CZ Rouveen and Fruitmasters have a similar risk to the risk of the stock exchange listed firms. That indicates that investments in the cooperatives are qualified as safe investments compensated with low returns compared to stock exchange listed firms.

These results suggest that investing in a hybrid cooperative is not very attractive for a profit driven investor which one is not scared for a higher exposure to risk. The financial risk is low but so are the benefits which suggest that the investment would not be part of an efficient portfolio focussed on high short-term profits. For a safety investment the investment in a cooperative would be attractive. It also implies that cooperatives that would like to attract extra equity from investors have to improve the returns on equity, which make the decision-making more difficult in the cooperative as extra profits will have to be paid by the members/farmers.

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Attachments

Attachment I

The table shows the beta of the different cooperatives derived from a linear regression in SPSS. The beta and the standard error are derived from the coefficients table produced by the linear regression function in SPSS. Besides the beta and the standard error the significance value and the corresponding t-value is displayed. The degrees of freedom confidence interval, the t-value and the significance level different from 1 are calculated manually. This table shows that the beta's of all cooperatives are significant except the beta of CONO. The beta of CONO is only sure with 90%. All others have such a strong accuracy that they are for 99% sure about the outcome.

Cooperative	Bèta (β)	Std. Error	t- level diff. from 0	Sig. level diff. from 0	df n-1	Confidence interval 95%	t-level diff. from 1	Sig. level diff. from 1
ACM	0.068	0.078	0.875	0.415	6	-2.4469 : 2.4469	-11.95	*0.000*
Aalsmeer	0.097	0.037	2.616	0.023	12	-2.1788 : 2.1788	-24.41	*0.000*
Agrico	-0.079	0.062	-1.275	0.218	18	-2.1009 : 2.1009	-17.40	*0.000*
Agrifirm 2002	0.114	0.095	1.195	0.277	6	-2.4469 : 2.4469	-9.33	*0.000*
Agruniek	0.068	0.051	1.336	0.2	16	-2.1199 : 2.1199	-18.27	*0.000*
AVEBE	-0.226	0.126	-1.802	0.088	18	-2.1009 : 2.1009	-9.73	*0.000*
Boerenbond Deurne	0.175	0.075	2.349	0.03	18	-2.1009 : 2.1009	-11.00	*0.000*
Campina Melkunie - Campina	0.019	0.026	0.733	0.477	13	-2.1604 : 2.1604	-37.73	*0.000*
Cavo Latuco	0.038	0.016	2.431	0.045	7	-2.3646 : 2.3646	-60.13	*0.000*
Cehave, Landbouwbelang - CehaveLandbouwbelang	0.103	0.067	1.546	0.143	15	-2.1314 : 2.1314	-13.39	*0.000*
CMW	0.013	0.031	0.437	0.675	7	-2.3646 : 2.3646	-31.84	*0.000*
CNB	-0.024	0.057	-0.412	0.685	18	-2.1009 : 2.1009	-17.96	*0.000*
CNC	-0.109	0.055	-1.975	0.064	18	-2.1009 : 2.1009	-20.16	*0.000*
CONO	0.540	0.258	2.093	0.051	18	-2.1009 : 2.1009	-1.78	*0.092*
Cooperatie ABC BA, CTA - ForFarmers Group	0.029	0.032	0.925	0.367	18	-2.1009 : 2.1009	-30.34	*0.000*
CRV	0.056	0.089	0.626	0.542	13	-2.1604 : 2.1604	-10.61	*0.000*
CZ Rouveen	0.361	0.159	2.267	0.037	17	-2.1098 : 2.1098	-4.02	*0.001*
CZAV	-0.029	0.025	-1.167	0.258	18	-2.1009 : 2.1009	-41.16	*0.000*
DGV, TP, FDF, H, ZOH	-0.117	0.081	-1.444	0.286	2	-4.3027 : 4.3027	-13.79	*0.005*
DOC Kaas	0.209	0.156	1.339	0.197	18	-2.1009 : 2.1009	-5.07	*0.000*
Flora, Holland - FloraHolland	0.044	0.025	1.786	0.099	12	-2.1788 : 2.1788	-38.24	*0.000*
FloraHolland Aalsmeer	0.015	0.026	0.578	0.594	4	-2.7764 : 2.7764	-37.88	*0.000*
Friesland FCDF - Friesland Foods	-0.057	0.094	-0.61	0.557	9	-2.2622 : 2.2622	-11.24	*0.000*
FrieslandCampina	0.025	0.029	0.856	0.455	3	-3.1824 : 3.1824	-33.62	*0.000*
Fruitmasters	0.242	0.115	2.107	0.055	13	-2.1604 : 2.1604	-6.59	*0.000*
Greenery - Combi	-0.1	0.104	-0.959	0.35	18	-2.1009 : 2.1009	-10.58	*0.000*
Horticoop 04	-0.122	0.075	-1.634	0.201	3	-3.1824 : 3.1824	-14.96	*0.001*
Horticoop 09	0.004	0.09	0.043	0.969	2	-4.3027 : 4.3027	-11.07	*0.008*
Lent	0.198	0.124	1.597	0.136	12	-2.1788 : 2.1788	-6.47	*0.000*
Nedato	0.003	0.044	0.06	0.953	18	-2.1009 : 2.1009	-22.66	*0.000*
Rijnvallei	-0.048	0.036	-1.341	0.199	16	-2.1199 : 2.1199	-29.11	*0.000*
Suikerunie - Cosun - Royal Cosun	-0.02	0.036	-0.562	0.581	18	-2.1009 : 2.1009	-28.33	*0.000*
ZON	0.043	0.038	1.135	0.271	18	-2.1009 : 2.1009	-25.18	*0.000*

Attachment II

The table shows the ranking of the cooperatives to the return on equity. Table 1 shows the ranking based on the return on equity and table 2 shows the ranking of the cooperatives based on the beta. Remark: The cooperative CONO is included in the tables, however its beta was not significant.

Table 1

Cooperative	ROE	Bèta (β)
CONO	58.28	0.540
CZ Rouveen	35.50	0.361
FrieslandCampina	13.02	0.025
Horticoop 04	8.22	-0.122
Lent	8.14	0.198
Friesland FCDF - Friesland Foods	5.75	-0.057
Agrifirm 2002	4.73	0.114
FloraHolland Aalsmeer	4.70	0.015
Cooperatie ABC BA, CTA - ForFarmers Group	3.83	0.029
CRV	1.34	0.056
Greenery - Combi	0.87	-0.1
DOC Kaas	0.75	0.209
CZAV	-0.36	-0.029
Boerenbond Deurne	-0.51	0.175
Suikerunie - Cosun - Royal Cosun	-0.54	-0.02
CNB	-1.20	-0.024
Rijnvallei	-1.52	-0.048
Fruitmasters	-2.40	0.242
CNC	-2.81	-0.109
Nedato	-2.90	0.003
CMW	-3.80	0.013
Agruniek	-3.84	0.068
Agrico	-4.71	-0.079
ZON	-4.77	0.043
Aalsmeer	-6.54	0.097
Cehave, Landbouwbelang - CehaveLandbouwbelang	-6.91	0.103
Flora, Holland - FloraHolland	-7.33	0.044
Campina Melkunie - Campina	-7.57	0.019
AVEBE	-7.78	-0.226
Horticoop 09	-11.93	0.004
ACM	-13.32	0.068
Cavo Latuco	-15.33	0.038
DGV, TP, FDF, H, ZOH	-19.60	-0.117

Table 2

Cooperative	Bèta (β)	ROE
CONO	0.540	58.28
CZ Rouveen	0.361	35.50
Fruitmasters	0.242	-2.40
DOC Kaas	0.209	0.75
Lent	0.198	8.14
Boerenbond Deurne	0.175	-0.51
Agrifirm 2002	0.114	4.73
Cehave, Landbouwbelang - CehaveLandbouwbelang	0.103	-6.91
Aalsmeer	0.097	-6.54
Agruniek	0.068	-3.84
ACM	0.068	-13.32
CRV	0.056	1.34
Flora, Holland - FloraHolland	0.044	-7.33
ZON	0.043	-4.77
Cavo Latuco	0.038	-15.33
Cooperatie ABC BA, CTA - ForFarmers Group	0.029	3.83
FrieslandCampina	0.025	13.02
Campina Melkunie - Campina	0.019	-7.57
FloraHolland Aalsmeer	0.015	4.70
CMW	0.013	-3.80
Horticoop 09	0.004	-11.93
Nedato	0.003	-2.90
Suikerunie - Cosun - Royal Cosun	-0.02	-0.54
CNB	-0.024	-1.20
CZAV	-0.029	-0.36
Rijnvallei	-0.048	-1.52
Friesland FCDF - Friesland Foods	-0.057	5.75
Agrico	-0.079	-4.71
Greenery - Combi	-0.1	0.87
CNC	-0.109	-2.81
DGV, TP, FDF, H, ZOH	-0.117	-19.60
Horticoop 04	-0.122	8.22
AVEBE	-0.226	-7.78

Attachment III

The table shows the ten variables used to show significant differences between the clusters. For each cooperative is given the average value of that particular variable. The ten variables are: standard deviation (volatility), debt/equity ratio, EBIT per total assets, net results per member, solvability, sector of the cooperative, function of the cooperative, nationally or internationally focussed, average equity and the average members.

Cooperative	Stand.dev.	D/E ratio	EBIT/T assets	Net R / Member	Solvability	Sector	Function	Sales Nat./Int.	Av. Equity	Av. Members
ACM	4.34	2.02	4.19	0.12	33.14	Seed, Feed, Consultancy	Purchasing & Marketing	National	72508	13304
Aalsmeer	3.75	4.77	4.17	1.14	17.34	Flowers	Marketing	International	68894	3501
Agrico	6.95	1.49	4.47	0.76	40.19	Seed potatoes	Purchasing & Marketing	National	24624	1274
Agrifirm 2002	7.73	1.32	1.73	0.48	43.16	Seed, Feed, Consultancy	Purchasing & Marketing	National	136397	15841
Agruniek	5.62	0.59	1.80	0.95	62.81	Seed, Feed, Consultancy	Purchasing & Marketing	National	5899	371
AVEBE	14.65	1.70	3.93	0.57	37.02	Starch potatoes	Marketing	National	184712	4492
Boerenbond Deurne	9.15	0.79	19.54	2.03	55.88	Feed, Consultancy	Purchasing	National	19019	483
Campina Melkunie - Campina	2.16	2.23	1.80	2.65	30.95	Dairy processing	Marketing	International	478602	8449
Cavo Latuco	1.27	1.03	3.70	0.17	49.24	Seed, Feed, Consultancy	Purchasing & Marketing	National	36254	6682
Cehave, Landbouwbelang - CehaveLandbouwbelang	7.53	1.29	2.89	0.43	43.68	Seed, Feed, Consultancy	Purchasing & Marketing	National	165758	11631
CMW	2.15	2.46	4.36	0.25	28.87				7937	1954
CNB	6.20	1.38	2.79	0.76	42.05	Flowers	Marketing	National	20192	1839
CNC	6.55	3.32	3.85	4.10	23.13	Mushroom	Purchasing & Marketing	International	31807	408
CONO	30.86	1.63	19.82	17.94	38.00	Dairy processing	Marketing	National	19465	503
Cooperatie ABC BA, CTA - ForFarmers Group	3.46	0.88	7.62	2.46	53.20	Feed, Consultancy	Purchasing	National	133738	7005
CRV	7.96	0.62	3.38	0.07	61.72	Breeding	Purchasing	International	57091	29535
CZ Rouveen	18.31	0.89	168.48	12.50	52.88	Dairy processing	Marketing		20877	315
CZAV	2.75	1.42	3.53	1.03	41.26	Seed, Feed, Consultancy	Purchasing & Marketing	National	35616	2809
DGV, TP, FDF, H, ZOH	3.22	2.15	37.95	1.60	31.79	Dairy processing	Marketing	National	305663	8734
DOC Kaas	17.57	4.61	157.84	2.32	17.82	Dairy processing	Marketing	National	19011	802
Flora, Holland - FloraHolland	2.25	4.13	5.58	0.86	19.48	Flowers	Marketing	International	91421	5488
FloraHolland Aalsmeer	1.57	3.49	2.92	1.53	22.28	Flowers	Marketing	International	214044	4979
Friesland FCDF - Friesland Foods	6.54	2.09	8.04	8.87	32.40	Dairy processing	Marketing	National	729454	11766
FrieslandCampina	1.83	1.73	6.62	14.65	36.58	Dairy processing	Marketing	International	2015600	14903
Fruitmasters	11.73	2.70	2.11	0.13	27.05	Fruit, Vegetables	Marketing	National	23024	838
Greenery - Combi	11.44	8.92	2.73	0.84	10.08	Fruit, Vegetables	Marketing	National	56372	5021
Horticoop	5.32	1.99	3.46	0.40	33.47	Products for flowers & horti	Purchasing	National	18407	3395
Horticoop	2.54	1.54	0.55	-0.34	39.37	Products for flowers & horti	Purchasing	National	42276	2209
Lent	12.75	0.92	8.23	5.93	54.15	Products for flowers & horti	Purchasing	National	10519	269
Nedato	4.69	0.54	5.34	1.33	65.02	Potato wholesale	Marketing	National	13541	584
Rijnvallei	3.94	0.75	3.52	1.19	57.14	Seed, Feed, Consultancy	Purchasing & Marketing	National	32868	2295
Suikerunie - Cosun - Royal Cosun	3.89	1.25	5.60	5.34	44.37	Food processing	Marketing	International	582621	9454
ZON	4.21	1.25	2.13	1.02	44.41	Fruit, Vegetables	Marketing	National	39955	1490