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# Financial risks and factors affecting them on Finnish farms

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**Abstract—** As a consequence of rapid structural change and new investment support scheme agricultural debts have increased and concentrated heavily in Finland. In addition, New Basel Accord (Basel II) regulating the bank business requires more in-depth credit risk assessment from banks. Therefore, there are both endogenous and exogenous reasoning for researching the agricultural credit risks. The purpose of the study is to find out the factors that affect financial risks in agriculture as well as possible change in credit risks. Credit scores depicting the magnitude of financial risk for 664 Finnish FADN farms are calculated and an econometric model is applied to clarify which farm specific factors influence the credit score. According to the study increasing farm size decreases financial risks. Furthermore, higher yields that also reflect higher professional skills of the farmer decreases financial risks. In contrast, increasing debts also increase credit risks. In addition, cereal farms tend to have higher credit risks than animal farms. The latter is due to negative profitability development as a consequence of deteriorated grain prices. Even though credit risks in general have increased the number of farms facing substantial financial problems has not increased. However, given the perpetual economic development and structural change in Finnish farming industry the agricultural credit risks will increase. Hence, the lenders would be condemned to apply stricter criteria when granting loans and debt will not be granted to some smaller farms.

*Keywords—* Credit risks, financing, .

## I. INTRODUCTION

The structural reform of Finnish agriculture has been rapid in the last few decades. The EU (European Union) membership in 1995 did not have a major influence on agricultural structural change in Finland. However, agricultural investments have increased significantly since 1995. This is mainly due to the fact that major challenge of Finnish agriculture with respect to EU membership was to reduce the competi-

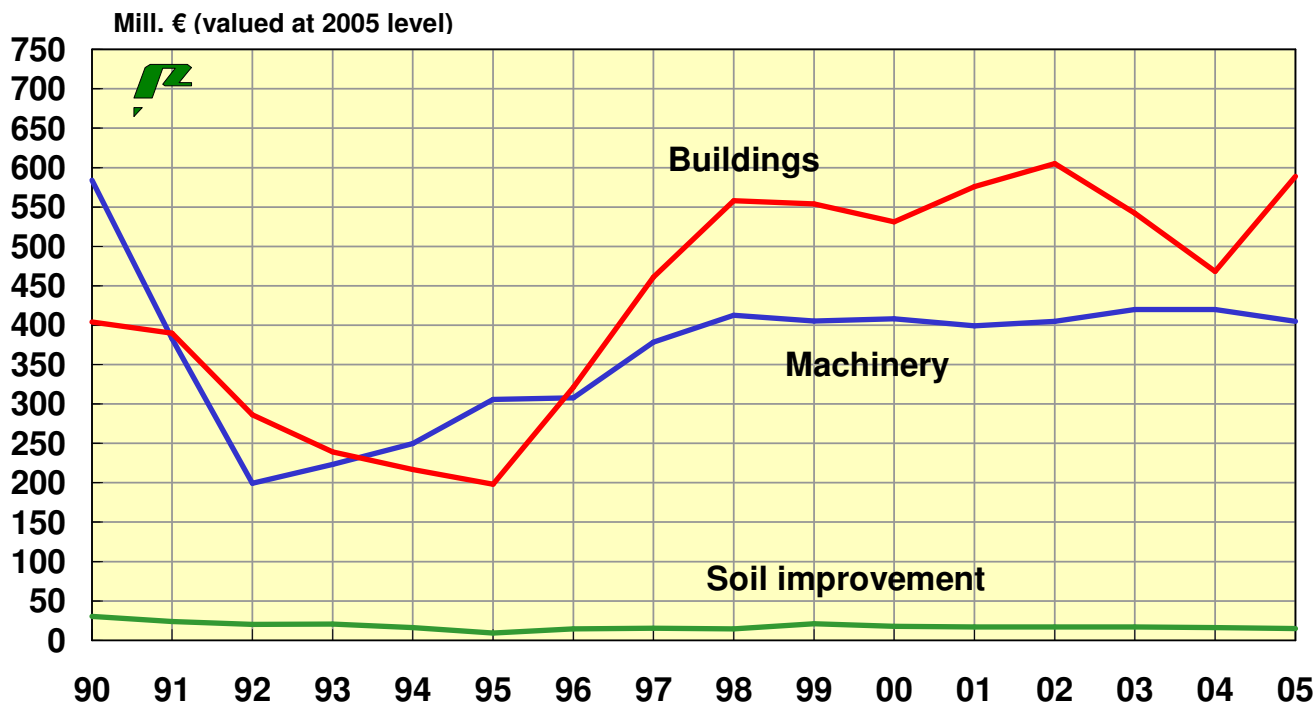
tive disadvantage as a consequence of smaller farm size compared to most important competing countries in the EU. To narrow this advantage down a completely new investment support policy scheme was introduced in 1995. The new investment policy has encouraged the farmers to make substantially larger investments than before. Development of agricultural investments is depicted in figure 1.

As a whole, the investments correspond with replacement investments necessary to maintain production capacity. On the other hand, several farms have made substantial investments. In addition, number of investments has decreased. The average size of investments has hence increased, as shown in figure 2.

Even though investments support have been to a larger extent aids, the total debts of Finnish agriculture have increased simultaneously with agricultural investments as larger investments have also required larger debts on the investing farms. This has led to quite heavy concentration of farm debts. the most indebted decile of cereal farms had 61 per cent of the debts of Finnish cereal farms. In addition, the most indebted decile of beef, dairy and piggery farms had 51 per cent, 46 per cent and 41 per cent of the total debts of the corresponding farms. [1]

Concentration of debts connotes greater financing risks for lenders. Hence, the lenders will apply tighter requirements for farm debts. In addition, the New Basel Accord (Basel II) regulating the bank business commenced in the beginning of 2007. It aims at ensuring that the lenders have sufficient amount of capital with respect to the risks connected to the loans they grant. Furthermore, Basel II requires the lenders to classify their clients according to the default risk. The more a bank has granted loans to those in credit risk classes with higher risks the tighter solvency requirements it has to fulfil. Hence, the credit risk class of the client will have an influence on interest rate margin bank grants [2]

## Investments in agriculture



Source: Statistics Finland

Fig 1. Investment in agriculture in 1990-2005

Thus far, the creditors have mainly focused on guaranteeing that collateral securities of the agricultural loans are sufficient. Hereafter, it is likely that the significance of liquidity, and profitability in addition to solvency, will increase regarding the agricultural loans. Thus, there are both internal and external reasons for more precise consideration of financial risks in agriculture.

### II. OBJECTIVE OF THE STUDY

The purpose of the study is to find out the factors that affect financial risks in agriculture as well as possible change in credit risks. Recognizing these factors will facilitate the development of risk rating as well as help the banks to improve risk classification tools relating to farms. Furthermore, the results will assist the development and planning of the investment support scheme.

### III. RESEARCH METHODS AND DATA

The analyses carried out in this study require farm level data. The panel data we apply in the study consist of 664 Finnish FADN farms (collected by MTT) that have kept the records both in 2000 and in 2005. The application of this data is reasonable because it can be assumed that also bank require more in-depth financial data of the clients they grant debts in the future.

In this study, we calculate a credit score for each farm. The credit score is composed of financial factors (subscores) depicting economic performance of a farm (profitability coefficient (weight 0,20), equity ratio (0,35), repayment period (0,35) and family farm income to gross return (0,10)).

The credit scores for each farm are calculated firstly by subtracting the average value of the subscores in the base year (2000) from the corresponding subscores of each farm. Secondly, each subscore is normalised by dividing it by the respective standard deviation in the base year. Finally, the total credit score for each farm is calculated using the above mentioned weights.

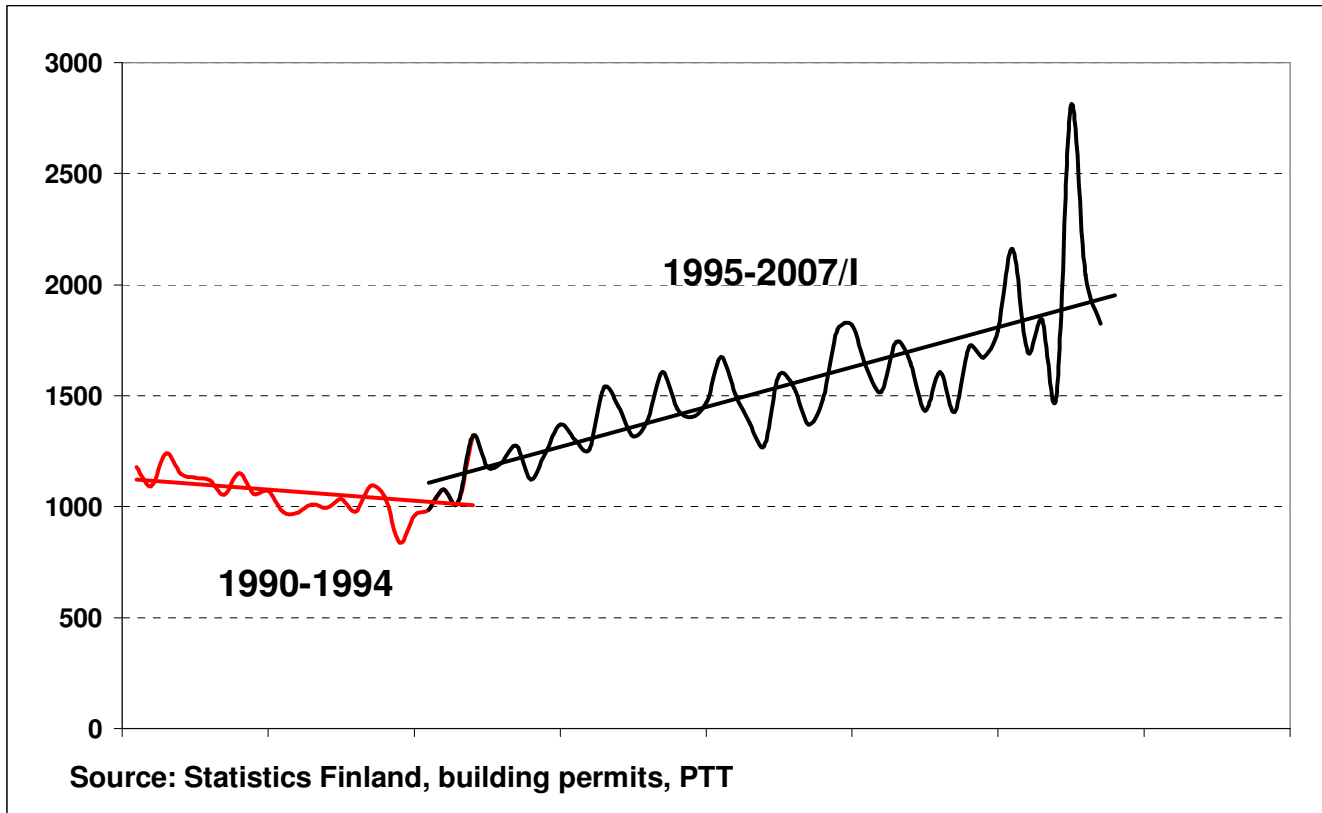


Fig. 2. Average size of Finnish agricultural buildings (m<sup>3</sup>)

In order to be able to construct a transition matrix the farms were divided into ten credit risk classes according to credit scoring in both 2000 and 2005. In analysing the factors affecting credit risks and credit risk changes we apply an econometric model.

#### IV. RESULTS

Average credit score in 2000 was 6.80, and in 2005 it had decreased slightly and was 6.44. Hence, the risks had increased at least to some extent. In 2000 share of farms in the three highest risk categories (credit score 1-3) was 3.2 per cent and in the four highest risk categories 8.7 per cent. In 2005 the corresponding figures were 4.1 percent and 11.7 percent. In contrast, in 2000 share of farms were in three lowest risk categories was 38.7 per cent, and in 2005 no more than 23.2 per cent of the farms.

Credit score transformations were, however, not too dramatic. The most common credit score was the third

lowest risk category 8 in 2000 and the fourth lowest risk category 7 in 2005. The distribution of credit scores of farms is represented in figure 3.

On farm level it can be detected that 43 per cent of farms had credit score with higher risk in 2005 than in 2000, whereas 38 per cent of farms had maintained the same credit score and 19 per cent of farms had moved to a risk category with lower risk in 2005 than in 2000.

A regression analysis was applied to clarify which farm specific factors influence credit score and, hence, credit risks. The explanatory variables of the model included factors concerning both economic performance and production process of the farms. In addition, dummies for different production lines and years were also applied. The results of the regression model are presented in table 1.

Large amount of agricultural debt, and hence significant loan costs, increase credit risk, as expected. Additionally, high interest rate increases credit risks. This may be partially due to the fact that not all assets can be used as collateral for a loan, which may increase the interest rate for a single farm. Also the creditworthiness of farms decreased from 2000 to 2005.

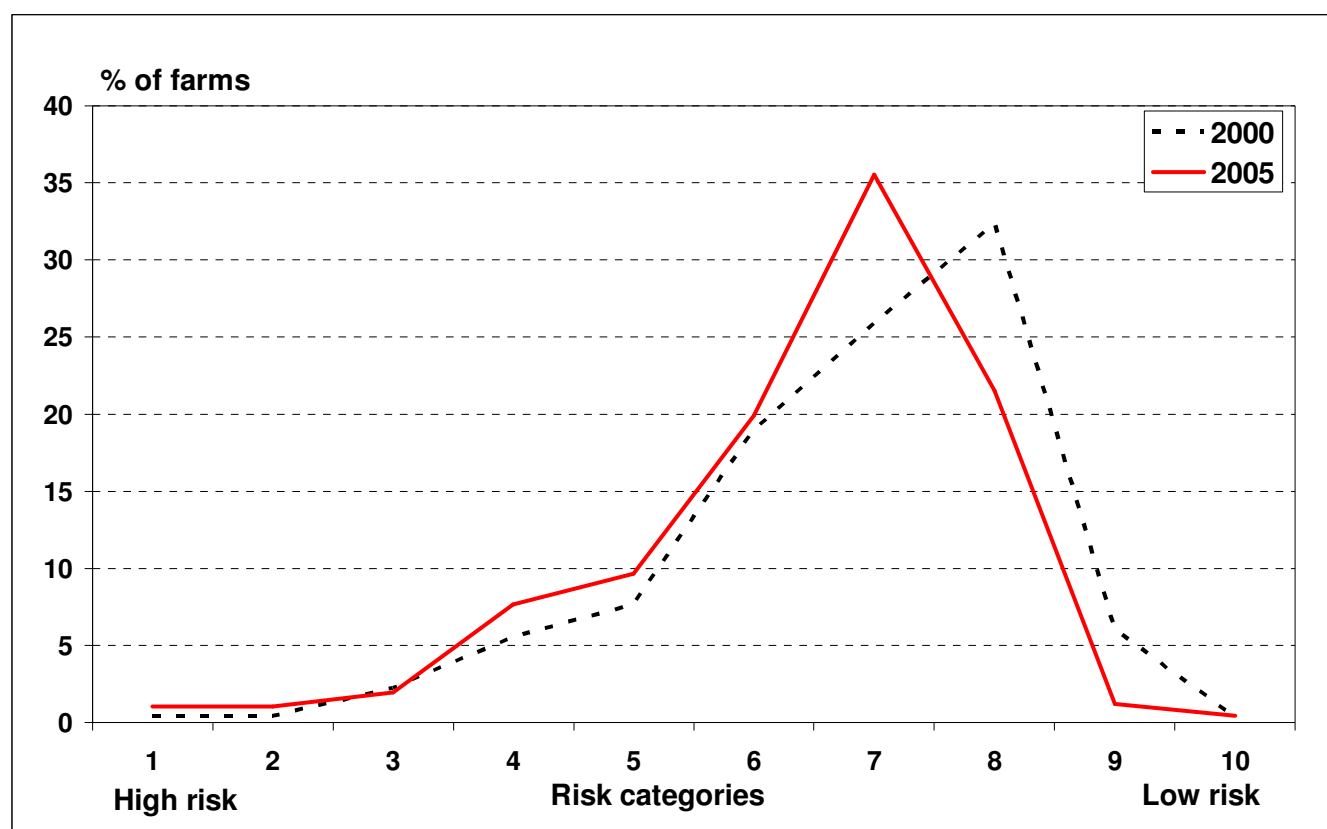


Fig. 3. Distribution of farms in risk categories

Increases in agricultural input prices explain at least part of diminishing creditworthiness.

Table 1 Results of the regression analysis

| Variable                           | Parameter estimate |
|------------------------------------|--------------------|
| Intercept                          | -0,04372           |
| Acreage                            | 0,00221***         |
| Capital in buildings and machinery | 0,00000113***      |
| Interest rate                      | -0,55055           |
| Total debts                        | -0,00000305***     |
| Yield                              | 0,00002977**       |
| D-cereals                          | -0,08647*          |
| D-dairy                            | 0,0211             |
| D-beef                             | 0,03943            |
| D-pig                              | 0,05497            |
| D-year                             | -0,05479           |

R<sup>2</sup> 0,231

F-test value 33,73\*\*\*

The larger a farm, with respect to both acreage and capital in agricultural buildings and machinery, the lower credit risks. The larger farms tend to have better profitability than smaller farms due to various reasons. In addition, solvency is often better on larger farms,

which implicates better collaterals for loans. The less investments have been financed with liabilities the higher the collaterals for loans and lower the interest rates.

Credit risks were also lower on those farms, which had a higher average yield. This is partially due to higher revenues and economic performance in general. Furthermore, higher yields also may mean higher professional skills of the farmer.

Credit risks of cereal farms have been higher than those of animal farms. This is at least partially due to decreasing grain prices of the first half of this decade. Therefore, feed costs have not increased significantly, which has been an advantage to animal farms. In contrast, revenues of cereal farms decreased and the profitability of cereal farms deteriorated. Hence, profitability development of cereal farms has been negative and inferior to animal farms.

## V. CONCLUSIONS

The credit risks have increased at least to some extent. However, this study does not clarify which credit

score means loss of creditworthiness. Therefore, even though number of farms in the risk categories with highest risks have increased from 2000 to 2005, based on this study it cannot be concluded that number of farms in serious financial problems have increased significantly.

Structural change of Finnish agriculture increases the amount of debt of the Finnish farms and, hence, financial risks. On the other hand, the largest farms tend to have inferior financial risks as a consequence of higher profitability and better solvency. In this respect the share of equity capital in investments has a crucial effect on credit risks.

Especially the energy costs have increased substantially in the last few years. In contrast, grain prices have increased since 2005. Even though the prices would not remain on the current level it seems undisputed that they will remain on a relatively high level. This improves the economic performance of cereal farms. In contrast, as a consequence of rising grain prices also the prices of feed will go up. Together with ascending energy prices the higher feed costs deteriorate the financial performance of animal farms.

Given the perpetual economic development and structural change in Finnish farming industry the agricultural credit risks will increase. Hence, the lenders would be condemned to apply stricter criteria when granting loans. Furthermore, the interest rates of high risk loans may rise even substantially. This would also mean significantly higher loan costs. In order to remain competitive the farms have to make investments and liabilities are fundamental in funding the investments. If the economic performance of the farm is not good enough it will not be granted loan with reasonable terms and, therefore, it is not able to make necessary investments. Hence, there is an inevitable connection between structural reform and increasing credit risks.

#### REFERENCES

1. Myyrä, S. ja Pietola, K. 2005. Velkojen keskittymisketjitys Suomen maataloilla. MTT:n selvityksiä 92(2005). 35 s.
2. Walraven, N. & Barry, P. 2004. Bank Risk Ratings and the Pricing of Agricultural Loans. *Agric. Fin. Rev.* 64:107-118.