CREDIT LEVEL INFLUENCING FACTORS AT HUNGARIAN FARMS

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In this paper we estimate the impact of different factors on creditability of agricultural farms. According to the literature the collateral (tangible assets), the farm size, productivity, and subsidies should have significant effects on farm loans. We use data from the Hungarian Farm Accountancy Data Network to test our two hypotheses and theoretical assumptions for the period 2001-2010. Because of using panel data, we do our estimations using fixed effects econometrics model to test our assumptions. The results indicate that the chosen factors have significant influence on total liabilities and short- and long-term loans as well. With specially interest of subsidies the growing level of supports decrease the need of other financial tools. At output factors (inclusive farm size) have significant and positive effect, same as collateral (tangible assets).
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I. Introduction

Financial situation of farmers and creditability is a standard and important topic in agricultural economics. For instance the farm productivity, the efficient production methods, the financial strategy are those factors, which could have determining effect on the amount of foreign finance and - of course - on creditability.

The EU accession of Hungary in 2004 have also role in agricultural financing, because of growing supports, which can substitute bank loans with more cheaper and – particularly after the financial crisis – more and easier available subsidies (Ciaian and Pokrivcak 2011:12).

On the other hand subsides (especially direct ones) can also upgrade income and productivity ratios, which could lead to not enough efficient production systems, because it hides efficiency problems at agricultural farms.

The main objective of the paper is to investigate, which factors are influencing the credit level of farms with specially attention to subsidies, output, and farm size. But naturally we take into consideration other elements that also could have role of choosing financial strategy.

During our analysis we would like to confirm our two hypotheses.

Hypothesis 1: If there are available subsidies and farms are not credit constrained and if we assume perfect credit market the subsidies are affecting (reduce) significantly credit level.

Hypothesis 2: If farms are not credit constrained and if we assume perfect credit market, the economic size of farms and amount of output have significant and positive influence on creditability.

To confirm our two hypotheses we divided the total liabilities of farms into short and long-term loans to see the difference of variable's behavior between long and short term financing.

II. Literature review

There are lot of studies, which are dealing with financial aspects of farms in different countries. This question according to the literature can be analyzed from two viewpoints. One is the credit availability of farms (credit access), and the second one is the financial standing of farms (capital structure, support level, productivity, etc.).

Because of high support level (direct or indirect) the agricultural sector's financial standing seems like better compared to other sectors. This could lead to soft budget constraints (Kornai, 2001:1573-1599) on agricultural firms, which can negatively influence farm performance. In concrete terms if a farm get higher level of direct support there is a possibility of sticking in a not enough efficient production system, they spend their budget not efficiently.
The collateral (we use tangible assets for simplification) has lower role in those countries where the financial institutions have closer knowledge of lending firms (Benjamin, 2002:1127). He analyzed France and Great Britain, he found that in France subjective factors have important role in farm financing. So the credit access is easier in this country compared to Great Britain where the sensitivity of collateral was higher. Because of the phenomenon in Great Britain, the level of tangible assets can be an important factor, which determines the level of loan. In addition, for better creditability farmers should improve their willingness to use farm assets for collateral (Pederson and Khitarishvili 1997: 29-30).
There was another study, which analyzed credit availability in Kenya (Carter and Wiebe 1990:1150). It is very far from the Hungarian situation but it should be seen the availability of convenient funds is crucial. They expertise the same in this African country, where the credit availability was higher the development of farms was also better.
Farmers with low debts are liquidity constrained (Bakucs, Ferto and Fogarasi 2002:122-124). Beside this at corporate farms where the budget constraint is soft the debt is higher. We think for this observation can be a reason of higher level of support and other revenues. That is why in our developed model we not just involve support variable, but European size unit (ESU) of farms as well. We assume this should have also significant effect on credit level.
Profitability is a key factor of farm financing. (Swinnen 1999:44-45). If a farm has low profitability, any central corrections to solve inefficiencies are not enough, if the profitability does not improve. So the income (profit) gives relevant information about the need of external financing and about financial standing.
At farm financing the financial managerial style, the financial strategy (conservative, aggressive, etc.) can also determine the future access to bank loans (Bierlen and Featherstone 1998:434). Although it would be important to implement it into the model we do not deal with this aspect, because lack of data.

III. Methodology and Data

In our research we used FADN (Farm Accountancy Data Network) data from 2001 to 2010 for Hungarian farms. This database is compiled and maintained by the Hungarian Research Institute of Agriculture Economics. This is a European Union compulsory system of national surveys, which collect natural, structural and mostly financial data from corporate and incorporate farms. The Hungarian sample size is around 1900 farms per year, which represents almost (it contains farmers bigger than 2 European Size Unit) the total agricultural production of Hungary. The farm level data is confident so we can present in our paper only aggregate information.
The FADN data is a panel dataset that means farms, which stay in whole analyzed period in the database can traced over the 10 years using a special identifier number. So we used panel data to examine the loan level of farms. We did not do special selection of farms at this first stage we put all of them in our models.
We applied eight independent variables (Table 1.) in our three estimations, which according to literature and our expectations can explain the credit level and need of Hungarian FADN farms. According to already in the introduction mentioned reasons support and tangible assets are determining factors of creditability. We put in the model farm size and output variable, because the size of production and farms can determine the total liabilities according to our assumptions.
In our first model we used liabilities not total loans as dependent variable, because there are other financial channels like leasing or factoring, which also very similar to normal loans, and has to

added to the model. The level of inventory and receiver can also determine the level of mainly short-term loans but possibly long-term loans as well. The best would be if creditors (acc_payabl) could finance the debtors (receiver), otherwise there is a need for higher amount of short term loan to finance the farm's operation.

Table 1. Description of data

Variable	Obs	Mean	Std. Dev	Min	Max
esu	19146	86.21778	257.944	1.108638	8391.044
support	19146	12139.71	39253.83	0	1215545
total_output	19146	90692.48	297042.2	-2147	8482212
inventory	19146	25536.61	106594.2	0	3497385
tang_assets	19146	72584.55	199157.2	0	7748015
receiver	19146	6038.246	30089.27	0	1135411
income_btax	19146	7050.054	27451.59	-934141	669385
acc_payab	19146	6173.724	35837.2	0	2657224
loan_long	19146	6557.526	33797.95	0	1971741
loan_short	19146	9208.529	68883.51	0	3388147
liabilities	19146	42176.04	187809.3	-39	9081393

Source: FADN national Hungarian database

We use panel data and estimate fixed effects model. This model helps to control the unobserved heterogeneity component that remains fixed and the effect of omitted variables is lower (Ciaian, Pokrivcak 2011:10).
We estimated three models:

$$liabilities_{jt}=\beta_0+ b_j+\beta_e*esu_{jt}+\beta_s*support_{jt}+\beta_o*total\_output_{jt}+\beta_a*tang\_assets_{jt} +\beta_r*receiver_{jt} +\beta_i*inventory_{jt} +\beta_p*acc\_payable_{jt}+\varepsilon_{it}, \quad (1)$$

$$loan\_long_{jt}=\beta_0+ b_j+\beta_e*esu_{jt}+\beta_s*support_{jt}+\beta_o*total\_output_{jt}+\beta_a*tang\_assets_{jt} +\beta_r*receiver_{jt} +\beta_p*acc\_payable_{jt}+\varepsilon_{it}, \quad (2)$$

$$loan\_short_{jt}=\beta_0+ b_j+\beta_e*esu_{jt}+\beta_s*support_{jt}+\beta_o*total\_output_{jt}+\beta_a*tang\_assets_{jt} +\beta_r*receiver_{jt} +\beta_i*inventory_{jt} +\beta_p*acc\_payable_{jt}+\varepsilon_{it}, \quad (3)$$

where j, t represents farm j and time t, b_j is the fixed effect for farm j, and ε_{it} is the residual term.
We are especially interested in assets, support, and output but the other variables especially inventory at short term loans should have also positive effect.
(As it can be seen we omitted in Model 2 inventory variable, because in the first tests it was insignificant, and distorted the results for the total model.)

IV. Results of research

The results are presented for total liabilities, long-term loans and short term loans (Table 2.). The model $R^{2'}$s within the model range 0.4 to 0.73. If take a look on variables all of them significant in all of the models presented in the previous section.
On the basis of hypotheses, and literature we focus on support, income (income_btax), European Size Unit (esu), and output (total_output) firstly. In all of the three models these variables are strongly ($p<0.10$) significant. The support coefficient is negative, which confirms our hypothesis

that support negatively influences loan changes. So if the amount of support is growing the farm need of credit is decreasing. So we can confirm our hypothesis 1. at first and third model.
The esu variable has changing effects across the three models. At the first and third one it is positive as we assumed before. In the second one it is negative, which is the case when the relationship between long-term loans and farm size is non-linear.
The output is significant and positive that indicates if the output is growing the creditability of farms is also increasing. So partly- in the first and third model – we can confirm our hypothesis 2. that means output and firm size has positive and significant effect on creditability.
Although the income (income_btax) variable is significant but is negative. One reason could the non-linearity the other is if the income grows the need of credit is decreasing. So income can be realized as own financial resource.
As in the literature mentioned the level of collateral is very important factor. It is also confirmed by our model, because the tangible (long-term) assets (tang_assets) are also strongly significant and positive in all of the models.
The other variables used in the model give also significant results. The only exception is inventory because this variable was insignificant in the second model. The reason could be that long term financing is less connected to inventory or short term assets so the level of long-term loans is not determined by inventories.
At the creditors (acc_payab) and debtors (receiver) in all model we got significant results. These two variables have decisive role at total liabilities and short term loans. The reason for that if the creditors could not finance debtors, we need more short-term loans or other financial tools to stabilize working and liquidity. If the level of short –term tools is growing the total amount of liabilities is also increasing.

Table 2. Summary of results

	Model 1 (Ind: Liabilities)			**Model 2 (Ind: loan_long)**			**Model 3 (Ind: loan_short)**		
	Coeff	***t***	***P>ItI***	***Coeff***	***t***	***P>ItI***	***Coeff***	***t***	***P>ItI***
esu	13.69	1.84	0.065	-11.112	-3.46	0.001	28.835	5.75	0.000
support	-0.242	-8.58	0.000	-0.0234	-1.9	0.057	-0.09122	-4.79	0.000
total_output	0.14	17.94	0.000	0.0664	20.36	0.000	0.0734	13.92	0.000
inventory	0.475	28	0.000	-	-	-	0.448	39.16	0.000
tang_assets	0.585	87.89	0.000	0.185	63.63	0.000	0.138	30.81	0.000
receiver	0.733	31.08	0.000	0.09185	8.9	0.000	0.314	19.72	0.000
income_btax	-0.393	-23.44	0.000	-0.167	-22.93	0.000	-0.0875	-7.73	0.000
acc_payab	0.794	43.39	0.000	-0.0726	-9.25	0.000	0.166	13.45	0.000
constant	-29962	-45.38	0.000	-10564	-36.67	0.000	-22646	-50.81	0.000
R.sq (within)	0.728			0.4032			0.45		

Source: Own calculation

V. Conclusions

During our research we estimated the impact of output variables, collaterals, subsidies, income on agricultural farm credit. Firstly we analyzed the theoretical background of the research, which factors would be relevant to implement them in the model. In the empirical part we used farm-level panel data from Hungarian FADN database to test our two hypotheses. We created three models, where we differentiated the dependent variable to total liabilities and short or long-term loan. We used fixed effects model for estimation.

In the following we summarize our main implications:

– According to results if the amount of support (subsidies) is growing the farm need of credit is decreasing independently whether it is short-or long-term. So we can confirm our first hypothesis.

– Partly - at total liabilities and short-term loans – we can confirm our hypothesis 2 that means output and firm size has positive and significant effect on creditability and credit level.

– We found that income has negative and significant effect on farm loans. The income could be one form of own finance, so if the own financial tools like income (which are much cheaper than credits) have increasing role, the need of credit is decreasing.

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