

## EFFICIENCY OF BORROWED CAPITAL IN LATVIAN AGRICULTURAL HOLDINGS

Valda Bratka, Arturs Praulins

*Latvian State Institute of Agrarian Economics, Latvia, [rebucija@inbox.lv](mailto:rebucija@inbox.lv)*

### Abstract

The rapid development of economy in general and agricultural sector in particular has been succeeded by recession. The increased price of input factors, the decrease in sales volume (total output) and cut of state subsidies is an important challenge for Latvian agricultural holdings. Obtained credits is the easiest solution and the most popular way to additional business financing. Nevertheless this strategy is leading to the essential credit risk and increased leverage, which influences the agricultural holding's growth through its effect on the expected return to equity capital. The objective of this research is to study and to evaluate the financial advantage of borrowed capital and determine its' impact on efficiency of Latvian agricultural holdings, grouped by ESU and types of farming. The main source of quantitative information for authors' calculations is data obtained from EU FADN national liaison agency in Latvia.

*Keywords:* financial leverage, agricultural holdings, Latvia.

### Introduction

Farm management researchers have spent a considerable amount of effort examining the factors underlying farm profit differentials. At its most basic level, farm profitability is dependent upon both the amount of the factors of production employed (inter alia borrowed capital) and the methods by which these factors are combined. The amount of the factors will be employed include initial resource endowments, factor availability and prices, expectations regarding the productivity of the factors, and risk preferences. The ability to productively combine the factors of production is also critical. Obviously, actual farm management and profit maximization present a complex and complicated problem. Therefore it is quite reasonable to hypothesize that some managers are more successful in maximizing profits than others.

The objective of this research is to study and to evaluate the financial advantage of borrowed capital and determine its' impact on the efficiency of Latvian agricultural holdings, grouped by ESU<sup>1</sup> and types of farming. In order to achieve this objective the methods of monographic and comparative ratio analysis, statistical data processing, statistical grouping, literature study as well as inductive - deductive research were used. Consequently conclusions are formulated concerning the most peculiar and problematic aspects of Latvian agricultural holdings' activities. The main source of quantitative information for authors' calculations is SUDAT (*Saimniecību uzskaites datu tīkls*), which is an integral part of EU FADN (Farm Accounting Data Network).

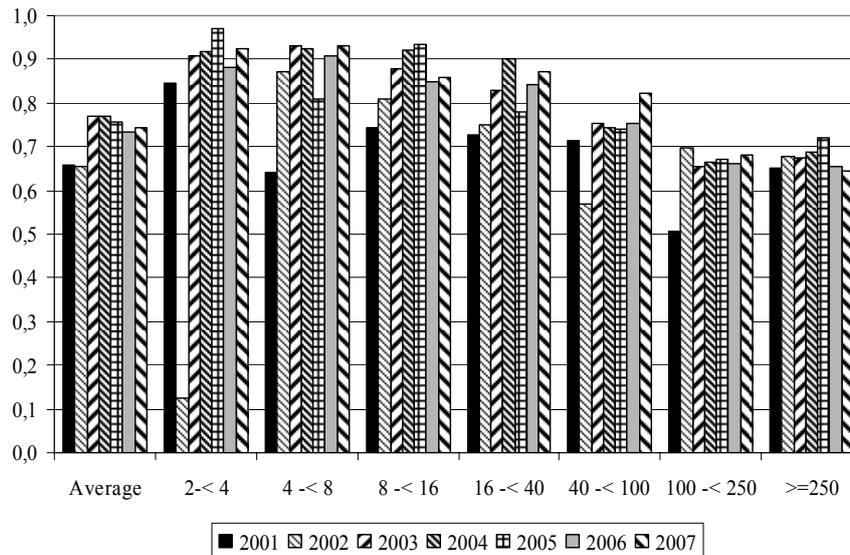
Though a number of authors have already analyzed in their works the effect of financial leverage upon return on equity in Latvian agricultural (Bratka & Prauliņš, 2007; Jakušonoka, 2007; Kotāne, 2008) and non-agricultural holdings (Garanča, 2008), this research paper is particular with its novelty, because unlike the previous papers there is:

- 1) estimated not the average effect of financial leverage upon all agricultural holdings in general, but by grouping them by *type of farming* and economic size groups, thus providing the possibility to estimate the effect of holdings economic size and sub-industries upon financial leverage (the results of the research speak for the essence of such an effect).
- 2) not used in calculations total weighted average annual interest rate of loans (over 1 year) in national currency (obtained from Bank's of Latvia statistics database), which is considered not to meet the real rate by many reasons. In the first place, agricultural holdings intensively borrow credits in foreign currency, in the second place, the conditions of agricultural crediting (and interest rates) differ essentially from the average level of national economy. In this research, along with this, interest rate was calculated for each holdings group separately (paid interests divided by the amount of interest bearing loans at the end of the year).
- 3) used in calculation the data on interest bearing loans, not on total debt, thus, increasing considerably accuracy and reliability of the calculations. This precondition is particularly

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<sup>1</sup> A European Size Unit (ESU) is a measure of the economic size of a farm business based on the gross margin imputed from standard coefficients for each commodity on the farm. 1 ESU is 1200 EUR and roughly corresponds to either 1,3 hectares of cereals or 1 dairy cow or 25 ewes or equivalent combinations of these.

important for effect of financial leverage calculation in agricultural holdings over 40 ESU, where interest bearing loans have decreasing proportion in total debt (Figure 1).



**Figure 1.** The proportion of interest bearing loans in the total debt of agricultural holdings (grouped by ESU, 2001-2007)

### Proceeding findings

Farm managers must make a variety of financial management decisions. These decisions often relate to acquiring financial resources either through borrowing or leasing, determining the amount of debt used to finance the business, developing the appropriate structure of debt claims (among short-, intermediate-, and long-term obligations), and keeping and analyzing farm records. Each of these topics has received some attention from researchers. Most of the empirical work in this area has explored the relationship between farm profitability and various measures of financial leverage.

Measures of the amount of debt used by the farm are typically treated as exogenous variables. However, with long-term farm profitability, there are several reasons to expect debt levels may be endogenous. Farms with a track record of achieving a rate of return on assets above the rate of interest on debt should have greater access to leverage and be more willing to use debt, because such a strategy will positively leverage the rate of return on equity. At the same time, the cost of capital is assumed to be less for high-profit farms. In contrast, if farms have gone through periods of low profitability, it is possible they would have greater need for debt funds. Regardless of the scenario, it seems possible that profitability would impact debt use.

The effect of financial leverage in the agricultural holdings has been previously studied in the publications. The empirical findings related to the impact of debt on farm profitability reveal mixed results. There were observed no significant effect (Mishra & Morehart, 2001) or reported mixed results, depending upon what measure of farm performance is used as the dependent variable. In general, the sign tends to be negative when the coefficient is statistically significant. (Kauffman & Tauer, 1986) On average, farms earned a rate of return on assets which was less than the cost of debt capital. As a result, the debt-to-asset ratio was negatively related to the rate of return on equity (Purdy et. al., 1997). Also farm technical efficiency was found to be influenced by debt structure. A significant negative relationship was found between the efficiency and current debt-to-assets ratio and positive relationship with the intermediate debt-to-asset ratio (Lambert & Bayda, 2005).

### Results and discussion

The relationship between the proportion of assets financed with debt and return on equity is unclear. Because interest expense is added to net farm income in the calculation of return, the effect of debt use should, in theory, be zero. However, managers would be expected to use debt funds to acquire resources they consider to be highly profitable and which would enable them to increase return on equity. As leverage

increases from a low level, the rate of return on equity increases if the rate of return on assets exceeds the cost of borrowing, because more assets are working for each EUR of equity. This is the well-known leverage multiplier effect. Since increases in leverage also increase the probability of a disaster which causes increased risk of loss for the lender, the cost of borrowing also increases with leverage. Therefore the rate of return on equity increases at a decreasing rate. (Collins & Karp, 1993).

If farmers' expectations regarding the profitability of additional investments are accurate, then debt use should have a positive impact on return. Conversely, if farmers have not realized the returns they anticipated when they used debt to purchase additional assets, then debt funds use to acquire resources actually reduces overall profitability. There are several possible explanations for this result: the farmers may have unrealistic expectations regarding the profitability of the assets they are purchasing with additional debt or they may have generally underestimated the additional management resources necessary to most productively employ the assets (additional investments required more managerial talent than the farm manager possessed).

On the other hand, there is a strong potential for an endogenous relationship between the proportion of debt used by the farm and profitability. The amount of debt used by the farm is also seemingly a function of farm profitability. More profitable farms should be able to carry more debt. Conversely, unprofitable or less profitable farms wishing to continue farming likely are forced to use debt of necessity.

Formula (1) is generally used for calculation of ROE (Higgins, 1996)

$$ROE = r + (r - i) \times D / E(1)$$

r – operating return on assets [ = EBIT × (1 - t) / total assets ]

i – after-tax interest rate [ = j × (1 - t) ]

D – outstanding interest bearing loans

E – equity

t – tax rate for agricultural holdings

j – corporate interest rate

Calculating the effect of financial leverage ( $E_{fl}$ ) authors have simplified and rearranged formula (1) to formula (2).

$$E_{fl} = (r - i) \times D / E = (EBIT / total\ assets - j) \times (1 - t) \times D / E \quad (2)$$

An interest rate j was calculated for each agricultural holdings' group and type of farming as interests paid divided by the interest bearing loans. Generally the interpretation of effect of financial leverage is based on the principle of majorant (Шутенко, 2007), i. e. the return on equity should exceed the return of investors (lenders and creditors).

By the data from Central Statistic Bureau for 2000-2005, there was stated (Jakušonoka, 2007), that for years Latvian agricultural holdings  $E_{fl}$  had been having a trend to increase gradually from -8,57% up to 7,17%. In 2003  $E_{fl}$  became positive (0,57) for the first time. As another author's research indicates (Kotāne, 2008), Latgale region agricultural holdings ROE of agricultural, hunting and forestry farms in years 2001-2006 increased from 7,39% up to 16,50%, reached its maximum in year 2003 (24,83%) and has stabilized since year 2004 at the level of 16,50-16,92%. In its turn  $E_{fl}$  change had fluctuating character: from 2001 to 2003 it grew from 0,55% to 9,02%, in 2004 it dropped to 6,06% and in the following 2 years it increased to 8,60%. Comparing to average values in Latvia, during the analyzed period ROE level in Latgale holdings was lower (on the average 15,97% and 22,43%), but interest rate of loans – higher (3,58% and 2,27%). Still it is rather difficult to compare the results of the mentioned above research with the calculations of this paper, because the data used for them differ much.

In 2001-2007  $E_{fl}$  of agricultural holdings had specific fluctuations (Table 1). Almost in all agricultural holdings it had been growing through year 2005, which was followed by its drop and by the following increase in 2007 in most of holdings (except of the group from 8 to 16 ESU and over 250 ESU). In the holdings of economic size from 16 to 100 ESU  $E_{fl}$  drop started one year earlier. In very small and small holdings (in 2004 and 2006 – to 8 ESU, in 2003, 2005 and 2007 – to 16 ESU), but in certain years (2006-2007) also in the biggest holdings (over 250 ESU)  $E_{fl}$  was below the average level in agriculture, thus stating the inefficiency of borrowed capital. If, in years 2002-2003, the biggest proportion of liabilities was in the group from 40 to 100 ESU and over 250 ESU, then, since 2003, there is observed a clear relation – the bigger is the economic size of a holding, the bigger is debt-to-total assets ratio.

**Table 1.** Effect of financial leverage ( $E_{fl}$ ), total debt – assets (D/A) and interest bearing loans – assets (Li/A) ratio of agricultural holdings (grouped by ESU, 2001-2007)

		Average	2-< 4	4 -< 8	8 -< 16	16 -< 40	40 -< 100	100 -< 250	>=250
2001	$E_{fl}$ (%)	0,24	-0,07	-0,06	-0,13	-0,68	-1,80	-1,10	12,12
	D/A	0,19	0,01	0,07	0,11	0,28	0,33	0,40	0,59
	Li/A	0,13	0,01	0,04	0,08	0,20	0,24	0,20	0,39
2002	$E_{fl}$ (%)	-0,06	-0,04	0,05	-0,13	0,29	1,83	0,68	1,90
	D/A	0,21	0,05	0,10	0,14	0,21	0,54	0,32	0,59
	Li/A	0,14	0,01	0,09	0,11	0,16	0,31	0,22	0,40
2003	$E_{fl}$ (%)	0,91	-0,05	0,90	0,82	2,29	2,64	2,31	3,60
	D/A	0,21	0,02	0,14	0,17	0,26	0,33	0,29	0,53
	Li/A	0,16	0,02	0,13	0,15	0,21	0,25	0,19	0,36
2004	$E_{fl}$ (%)	3,71	0,26	1,53	3,78	7,80	5,97	3,68	5,24
	D/A	0,26	0,04	0,08	0,21	0,30	0,34	0,38	0,58
	Li/A	0,20	0,04	0,08	0,20	0,27	0,25	0,25	0,40
2005	$E_{fl}$ (%)	5,22	0,87	2,98	4,54	7,65	5,52	5,32	6,06
	D/A	0,34	0,06	0,15	0,25	0,36	0,40	0,47	0,62
	Li/A	0,26	0,06	0,12	0,23	0,28	0,29	0,32	0,45
2006	$E_{fl}$ (%)	3,67	0,42	1,53	3,98	5,64	4,49	4,49	2,64
	D/A	0,30	0,03	0,10	0,22	0,33	0,39	0,45	0,58
	Li/A	0,22	0,03	0,09	0,18	0,28	0,29	0,30	0,38
2007	$E_{fl}$ (%)	4,03	0,58	1,99	3,67	5,71	7,33	5,25	3,46
	D/A	0,34	0,06	0,12	0,26	0,31	0,40	0,46	0,58
	Li/A	0,25	0,06	0,11	0,23	0,27	0,32	0,31	0,38
$V\sigma$ (%)	$E_{fl}$	83	129	84	88	84	80	88	58
	D/A	24	50	28	30	17	22	16	12
	Li/A	28	70	31	34	20	9	21	14

The results of the research indicate that during the analyzed period of time in all types of farming were observed different and often going diversely changes of  $E_{fl}$  (Table 2). Most expressed (which is displayed with high  $V\sigma$ ) this is exactly for mixed farms.

**Table 2.** Effect of financial leverage ( $E_{fl}$ ), total debt – assets (D/A) and interest bearing loans – assets (Li/A) ratio of agricultural holdings (grouped by types of farming, 2001-2007)

		Fieldcrops	Horticulture	Permanent crops	Dairy	Granivores	Mixed crops	Mixed livestock	Mixed crops, livestock
2001	$E_{fl}$ (%)	0,17		-0,22	0,30	8,27	-0,09	-0,04	-0,21
	D/A	0,40		0,13	0,15	0,40	0,05	0,01	0,08
	Li/A	0,27		0,01	0,10	0,23	0,04	0,01	0,05
2002	$E_{fl}$ (%)	0,54	3,07		0,60	-1,66	-0,26	0,08	-0,21
	D/A	0,36	0,17		0,18	0,45	0,06	0,06	0,07
	Li/A	0,22	0,10		0,13	0,30	0,03	0,05	0,05
2003	$E_{fl}$ (%)	1,97	4,09	4,17	1,16	1,66	0,39	0,02	0,01
	D/A	0,29	0,22	0,34	0,16	0,44	0,12	0,04	0,09
	Li/A	0,23	0,18	0,30	0,13	0,30	0,10	0,03	0,06

2004	$E_{\pi}$ (%)	4,65	0,37	6,11	2,36	3,63	1,35	1,65	1,83
	D/A	0,34	0,61	0,50	0,13	0,55	0,10	0,10	0,13
	Li/A	0,25	0,52	0,45	0,11	0,38	0,08	0,09	0,11
2005	$E_{\pi}$ (%)	5,26	3,06	1,45	4,95	6,25	2,68	1,02	3,19
	D/A	0,40	0,44	0,35	0,23	0,63	0,17	0,07	0,19
	Li/A	0,30	0,27	0,22	0,19	0,44	0,13	0,05	0,16
2006	$E_{\pi}$ (%)	3,47	7,10	1,98	4,22	3,56	0,82	0,62	2,29
	D/A	0,36	0,51	0,25	0,23	0,59	0,07	0,06	0,23
	Li/A	0,27	0,34	0,19	0,19	0,40	0,06	0,05	0,14
2007	$E_{\pi}$ (%)	4,43	5,84	0,27	3,64	1,46	7,99	0,46	3,20
	D/A	0,38	0,67	0,20	0,24	0,61	0,33	0,06	0,26
	Li/A	0,28	0,40	0,14	0,20	0,40	0,30	0,04	0,19
$V\sigma$ (%)	$E_{\pi}$	70	60	106	75	99	110	174	155
	D/A	11	46	45	24	18	102	110	51
	Li/A	11	50	68	28	22	95	122	59

Nevertheless there is stated one common trend: agricultural holdings managed to increase the efficiency of their borrowed capital. As the exception, there could be mentioned permanent crops and mixed livestock farms, where  $E_{\pi}$  has decreased. In the first group the reason was the the growth of interest rate, as well as the decrease of debt-to-equity ratio, but in the second group – continuous decrease of profit during the last analyzed years. In its turn, the rapid growth of  $E_{\pi}$  in 2007 in mixed crops farms is explained with chronological shifting. Though the holdings intensively used external sources of financing to attract the capital (this is displayed with interest bearing loans-to-total assets ratio growth), interest payments stayed at the level of the previous years. This indicates that the repayment of credit will begin in 2008, when  $E_{\pi}$  drop is being expected also.

Till year 2003 the biggest proportion of liabilities in total assets was observed in granivores, permanent crops and field crops farms, which could be recognized as agricultural sectors of the highest credit risks. Starting with the next year proportion of liabilities in permanent crops farms started to decrease considerably (from 0,50 in 2004 down to 0,20 in 2007). The opposite trend was observed in horticulture farming – proportion of liabilities growth up to 0,61 (in 2004) and 0,67 (in 2007). The last value was the absolute maximum in Latvian agriculture for the period 2001-2007.

To be able to estimate if  $E_{\pi}$  change in particular types of farming meets general trends of Latvian agriculture, in terms of this research there was calculated the effect of financial leverage in two most important sectors of Latvian agriculture - in field crops and dairy farms.

Similarly to Latvian agricultural average values,  $E_{\pi}$  of very small and small field crop farms (to 16 ESU) was lower, than in field cropping industry on average (Table 3). Agricultural holdings group of economic size over 100 ESU was characterized by the lowest fluctuations of total debt and interest bearing loans proportion in total assets. This indicates, that, unlike small farms, managers of mentioned group plan thoroughly politics and strategy of both attraction of capital and accounts payable, which results into order and stability.

**Table 3.** Effect of financial leverage ( $E_{\pi}$ ), total debt – assets (D/A) and interest bearing loans – assets (Li/A) ratio of field crop farms (grouped by ESU, 2002-2007)

		Average	2-< 4	4-< 8	8-< 16	16-< 40	40-< 100	100-< 250	>=250
2002	$E_{\pi}$ (%)	0,54	0,00	0,39	-0,58	0,39	2,69	5,91	11,59
	D/A	0,36	0,26	0,11	0,17	0,23	0,63	0,46	0,71
	Li/A	0,22	0,00	0,09	0,15	0,17	0,33	0,33	0,52
2003	$E_{\pi}$ (%)	1,97	0,48	0,60	-0,13	2,44	3,19	4,65	9,60
	D/A	0,29	0,05	0,13	0,12	0,26	0,35	0,39	0,68
	Li/A	0,23	0,05	0,13	0,10	0,22	0,27	0,28	0,51
2004	$E_{\pi}$ (%)	4,65	1,05	0,95	1,18	6,58	6,19	4,76	12,01
	D/A	0,34	0,18	0,06	0,16	0,31	0,36	0,45	0,63
	Li/A	0,25	0,18	0,06	0,13	0,27	0,27	0,31	0,44

2005	$E_{\pi}$ (%)	5,26	0,13	4,85	3,18	4,78	5,34	5,34	10,07
	D/A	0,40	0,02	0,26	0,27	0,33	0,44	0,52	0,67
	Li/A	0,30	0,02	0,22	0,25	0,21	0,33	0,35	0,50
2006	$E_{\pi}$ (%)	3,47	0,02	1,16	2,20	4,34	4,08	4,00	2,00
	D/A	0,36	0,01	0,14	0,16	0,28	0,39	0,48	0,61
	Li/A	0,27	0,00	0,12	0,15	0,22	0,30	0,33	0,45
2007	$E_{\pi}$ (%)	4,43	0,38	0,56	2,19	6,58	7,98	5,79	5,60
	D/A	0,38	0,05	0,09	0,20	0,32	0,38	0,45	0,64
	Li/A	0,28	0,04	0,08	0,18	0,28	0,31	0,31	0,43
$V\sigma$ (%)	$E_{\pi}$	53	115	120	109	58	41	15	46
	D/A	11	110	51	29	14	25	9	5
	Li/A	12	135	47	34	18	9	7	8

Decrease of debt ratio fluctuations was observed also in holdings group from 16 to 40 ESU. In its turn, profit drop for 51% and paid interest growth for 20% caused  $E_{\pi}$  decrease in holdings of economic size over 250 ESU in 2006. Unlike field crops farming (Table 3), dairy farms, which  $E_{\pi}$  did not reach the average level, were smaller – to 8 ESU (Table 4). Only in 2005 their range considerably extended and included also holdings over 40 ESU, which is explained with high average  $E_{\pi}$  (4,95 %) of agricultural sector.

**Table 4.** Effect of financial leverage ( $E_{\pi}$ ), total debt – assets (D/A) and interest bearing loans – assets (Li/A) ratio of dairy farms (grouped by ESU, 2002-2007)

		Average	2-< 4	4 -< 8	8 -< 16	16 -< 40	40 -< 100	100 -< 250
2002	$E_{\pi}$ (%)	0,60	-0,08	0,83	0,38	-0,56	1,24	0,43
	D/A	0,18	0,00	0,14	0,13	0,15	0,55	0,21
	Li/A	0,13	0,00	0,12	0,12	0,10	0,43	0,11
2003	$E_{\pi}$ (%)	1,16	0,12	2,18	0,34	3,22	1,61	0,91
	D/A	0,16	0,02	0,20	0,13	0,25	0,21	0,21
	Li/A	0,13	0,02	0,17	0,10	0,23	0,16	0,11
2004	$E_{\pi}$ (%)	2,36	0,09	1,42	4,81	6,95	4,90	2,60
	D/A	0,13	0,02	0,08	0,20	0,23	0,19	0,24
	Li/A	0,11	0,01	0,06	0,19	0,21	0,13	0,13
2005	$E_{\pi}$ (%)	4,95	1,01	2,93	6,86	12,45	4,91	3,88
	D/A	0,23	0,06	0,13	0,25	0,41	0,30	0,35
	Li/A	0,19	0,06	0,11	0,23	0,36	0,14	0,22
2006	$E_{\pi}$ (%)	4,22	0,77	1,93	5,16	8,30	4,96	6,27
	D/A	0,23	0,04	0,08	0,23	0,40	0,34	0,43
	Li/A	0,19	0,04	0,08	0,21	0,36	0,26	0,29
2007	$E_{\pi}$ (%)	3,64	0,54	0,99	3,14	6,35	6,53	6,26
	D/A	0,24	0,05	0,05	0,20	0,32	0,41	0,46
	Li/A	0,20	0,04	0,05	0,19	0,29	0,34	0,30
$V\sigma$ (%)	$E_{\pi}$	62	106	46	77	73	52	75
	D/A	23	63	48	26	35	40	36
	Li/A	25	74	44	29	38	50	47

Growth of the average value promoted  $E_{\pi}$  changes in group from 16 to 40 ESU. Particularly, in 2005 on account of 12% profit growth, as well as debt-to-equity ratio increase to 0,61, there was reached  $E_{\pi}$  of 12,45 %, which was the highest effect of financial leverage in this sector of agriculture in 2002-2007. In its turn, due to gradual decrease of financial leverage in 2004-2007 (from 0,30 to 0,23) and EBIT drop for 39 %, comparing to 2005, excess of  $E_{\pi}$  over the average level was continuously decreasing in agricultural holdings from 8 to 16 ESU (from maximal 104 % in 2004 to 22 % in 2006). In 2007 it was smaller than the average of

sector for 0,5 percent points. Analyzing the fluctuations of debt proportion ( $V\sigma$ ) in different dairy farm groups, there was not stated any trend to decrease at growing economic size. Little fluctuations were observed only in the holdings group from 8 to 16 ESU.

### Conclusions

1. Starting with year 2003 there was clearly observed the relation – along with the growth of agricultural holdings economic size also debt-to-total assets ratio was growing.
2. Comparing to the beginning of the analyzed time period almost all types of farming (except permanent crops and mixed livestock farms) managed to increase borrowed capital use efficiency and to provide the growth of effect of financial leverage.
3. Agricultural holdings in granivores, permanent crops (till 2003), field crops and horticulture (since 2004) sectors took the highest credit risks in 2002-2007.

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DOI: 10.5755/j01.em.1.14.9292