

**University doctoral (PhD) dissertation abstract**

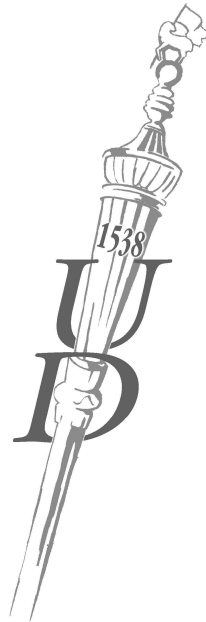
**ANALYSING THE FINANCIAL AND CAPITAL STRUCTURE  
OF CORPORATE FARMS IN THE PERIOD 2002-2006**

Adrienn Herczeg

Supervisors:

Dr. Zoltán Bács

Prof. Dr. János Borsos



**UNIVERSITY OF DEBRECEN**  
Karoly Ihrig Doctoral School of Management  
and Business Administration

Debrecen, 2009

## 1. The Aim of the Project

Analysis of capital structure of agricultural corporations is a key issue of economics and the effect of its fluctuation can be observed on several fields of the life of corporations. It wields influence shall I say the competitiveness of the sector, property status or financial and profitability situation of corporations, effectiveness of management, market value of the company as well as the expectable output rate of equity for owners. Though term of the analysis concerns years between 2002-2006, in the case of a research of capital structure - since these are long term decisions - particular changes of politics and economy in the last 1-2 decades shall not be forgotten insomuch as Hungarian agriculture still carries almost all the weight of the agrarian crisis following the regime change.

The regime change that passed off almost two decades ago did create significant alteration in the situation of agrarian sphere and it affected property and holding relations as well as internal and external market positions and therefore also the financing system of the sector. As a result of the referred processes the capital status of agrarian sector passed through important changes since unfavourable turns of economics also reflect in the conformation of capital structure.

*The main aims of my study are the followings:*

- *In the scope of a technical literature processing I lay and esteem the most important views, the dominant classical and modern theories of capital construction and definitions in connection with financing. I demonstrate the most important index numbers used for measuring capital structure, by this enabling the study of the emergence of statutorities of economic theories in corporations of Hungarian agrarian sector. In favour of a wide comprehension of information that can be retrieved from the accounting system of agrarian corporations, I find it necessary to enter into a brief review of the function, general state, property relations and income conditions of Hungarian agriculture in national economy and also a summary of the reasons of changes taking place in the capital system of agrarian sector.*

- *As a main aim* I study the analysis of fund- and capital construction of joint agricultural corporations running in Hungary in the period between the years 2002-2006. Within the scope of the analysis I enter into the following details.
  - Classification by many characteristics of corporations that appear in the database of the AKI's testwork information system as well as definition and analysis fund- and capital structure and profitability relations that typify each group.
  - Analysis of the relationship between capital structure and profitability, revealing determining factors of profitability and defining their effects. In this manner, I am looking for the answer whether selecting capital structure should take effect on the fluctuation of profitability of corporations, and if so, how.
  - Determining the capital structure with that profit running could be achieved in the most effective way. Analysing the connection of leverage and profitability, should there be a sort of equity proportion definable along which companies' profit running could be ensured.
  - Empiric test of agricultural emergence of capital structure theories.

Taking over my aims along related analyses I demonstrate fluctuation of the connection between fund- and capital structure and profitability in the period between 2002-2006. in agrarian production.

## 2. Antecedents and Methods Applied

In the scope of my study *calculations* in connection with the analysis of fund- and capital structure of agricultural corporations are *based on the Testwork database operated by the Research Institution of Agrarian Economy*. For the sake of better comparability of the data, I drew into the analysis only those companies among corporate farms which appear in the testwork system under constant running every year between the period of 2002-2006. Accordingly there are *192 companies that match my conditions*, of which a notable number could be classed in the plant producing group of GOFR. Besides, regarded to the size of the plant, around *85 percent* of analysed companies come under the 2 largest size category defined by AKI with *rates over 40 EUME* (European measure).

To substantiate my aims, during my research in the scope of a technical literature processing I reviewed the most important parameters of the fluctuation of financing, fund- and capital structure, especially considering their agricultural references. I cared especially the followings:

- agrarian financing,
- the system of agrarian supports, thus reviewing:
  - root causes of lack of capital in agrarian sector,
  - connection between capital structure and profitability of the sector.

I demonstrated capital structure theories considered to be the most important also in a technical literature processing, emphasizing their practical materialization, thus proving the fact that up to this day there is no existence of an accepted ruling theoretical trend for defining development of an optimal capital structure.

Using data made available for me by the Research Institution of Agrarian Economy I analysed changes that took place in capital structure of the agrarian sector as well as the effect of them in point of the financial and income conditions of corporations. All data appearing in the essay are reckoned as a weighted average of data of plants coming up in the model and also as a weighted average of the groups made up of them. For weighting I applied results of the Census of Economy Structure in 2005. as well as I also took the year 2005. as a basis for defining the type and economical size of corporations turning up in the panel data line. The weighting index reflects the number of corporations that a single corporation of the model

represents in a similar group of the basic mass. So thus the *result is representative not for the corporations coming up in the model of the essay but the mass they stand for.*

Balance data and internal proportions - *partition coefficients* - furthermore indices calculated based on these shall help to estimate occurring changes in the composition of assets and funds. Besides calculating average rates by using data of 192 companies in favour of a more accurate and more particular analysis I classified corporations by economic plant size and valued the average rates typical for each group separately. Based on economic plant size 56 out of 192 joint businesses are classified to small size category (SFH is no greater than 25 million forints), 56 to medium (SFH is greater than 25 million forints but maximum 80 million forints) and 80 to large size category (SFH is greater than 80 million forints). Number of plants of basic mass represented by certain size category is 3377, 1447, 922 in order. In consideration of the variants drawn in the analysis I calculated necessary basic statistic researches. Central part, median and average of the integrated model are defined according to the type of a certain variant.

Taking advantage of common methods of statistic analysis I defined the most important index numbers (such as leverage, capital strength and capital supply) regarded to the consideration of capital structure, their rates annually and by corporations, then I evaluated main tendencies in management of the sector by processing average rates calculated from these.

However, a classification of a database coming from various companies by financial relation numbers raises much problem. Taking a single variant – while financial relation numbers calculated by companies are compared one by one – the analysis seems to be hopeless. A calculation performed emphasizing only a few relation numbers goes together with loss of information since a single rate of performance ability can be measured with several index types of liquidity, profitability or indebtedness, not to mention the complex rating of the company efficiency (RÓZSA, 2004). Multivariant mathematic and statistic methods lend assistance to solve this problem, with which there is an opportunity to manage a large number of variants, to reveal internal coherency so thus the characteristics of the phenomenon shall be notable. Accordingly this, following the analysis by economic plant size for the sake of better consideration of performance ability of corporations I proceeded the analysis of corporations' capital structure looking for further analysing possibilities. *I chose the method of factor analysis for selecting index numbers that corporations use through cluster analysis.* With this I analyzed on apropos of certain factors whether they might be expressed as a linear

combination of a smaller number of hypothetical factors that replace the original variants in a way that much of the monitored information remain. After rating fractal weights and generating factors I put those backing factors under a research with which the monitored variants could be described. The factor analysis performed in this way opened the opportunity to test *by the hierarchical method of cluster analysis* whether processes of similar characteristics reflecting the status of economy, capital structure and profitability might be marked in connection with certain years and chosen indices.

After analysing processes passing off in capital structure of corporations I proceeded by *calculating correlation* looking for the answer whether there should be a connection between index numbers that mark the managing of corporations and the capital structure, and if so with what influence, plus whether the capital structure developed should take influence on profitability of corporations. With *regression calculating* I searched the volume of influence of chosen indices of capital structure on financial and profit situation of corporations, in addition I studied which variant of those that take a part in development of capital structure, should be in functional relation with profitability indices.

I used regression analysis for an empiric proof of capital structure theories and *cutpoint analyses* to study the credit distributing phenomenon by Stiglitz since in the subject of the database I searched the significance of wontedness and slant that marked damage of normality at many factors, furthermore in many cases even the terms of a dispersion homogeneity were not certain. Because of repeated damages of the two modelled T-test, a specified comparison of distribution seemed to be expedient within the confines of a *cutpoint analyses* which I performed with the assistance of the ROPstat 1.0 statistic pack of programs.

I got through data work, making tables and designing figures with the help of computer programs of Microsoft Word, Microsoft Exel, furthermore STATA 10. and ROPStat 1.0 statistic pack of programs.

### 3. Main Statements of the Dissertation

#### 3.1 General Evaluation of Capital Status of Agrarian Sector

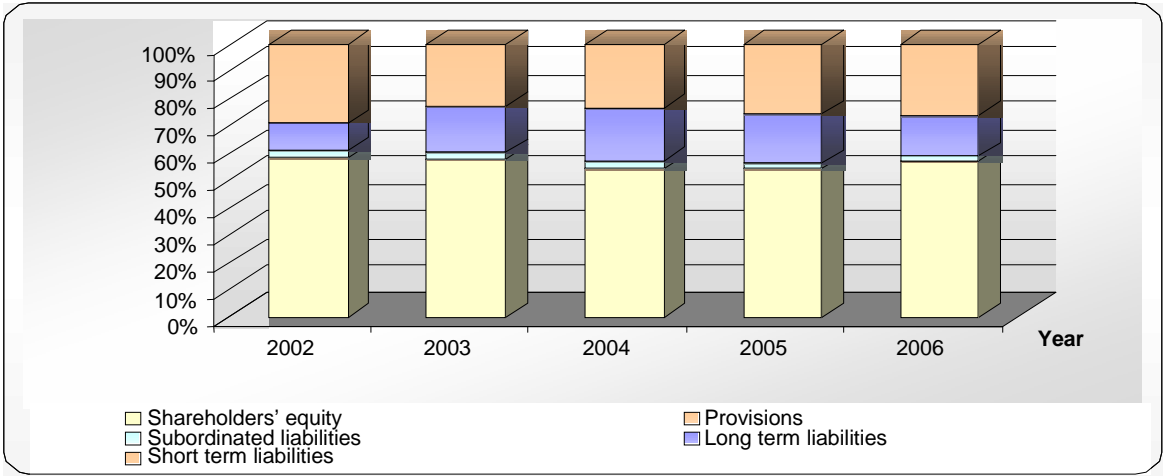
Dynamic growth of agrarian sector stuck in the years following the regime change; deteriorative processes began that showed up in reduction of production, in exodus of capital, in property loss and in indebtedness. As a result of these processes *resort substances of agriculture is worn-out and is out of date*; moreover on account of revolution in property relations in line with *huge rise of the number of owners, loss of size of possessed lands could be observed. Ownership of lands and the use of lands are now separated*. We have lost our competitive edge that originated in the concentration of lands. The lack of farmers' capital, the disorganization of producing and the reduction of inland consumption through the setback of living standard caused producing unmarketable amount of several products, which worsened on and on the anyways low profitability of the sector. (SZŰCS AND UDOVECZ, 1998) As a result of it all, the significance of *agrarian sector in national economy suffered an important drop*. Although in the year of the regime change agriculture produced 13,7% of then GDP and employed 17,4% of labour, in 2007. it only produced 4,2% of GDP and in turn employs only 4,7% of labour. Unfavourable turns of the situation of economy formulated in fluctuation of capital structure as well. Following the regime change, along with corporations becoming not solvent and depleting their assets, a regressive tendency of value and proportion of equity became general. *The sector's needs of capital showed up in lack of stock and in constantly unsatisfactory liquidity*. Most of the corporations that expensed activity at these new conditions were short of capital and had a low level capital accumulation (PFAU-NÁBRÁDI, 2004).

Problems of agrarian financing correlate to characteristics of agriculture worldwide. „ Roots of contradicts is that agrarian interests come up against the profit orientation of financial system: bank sphere may only credit strictly commercialized and by assuring the proper benefit of loan even to agriculture, and therefore it could not take allowance into supporting system either on the score of food producing being general interest” (TANKA, 1998). For this, the less agrarian prices are reflecting costs of production, and the larger difference being between profitability rate and money-rate at banks, the more important state subsidy is in agrarian financing.

Financing routine and adapted loan system of Hungarian agrarian sector differs in many ways of other sectors of national economy. These differences are in connection with characteristics of production and cooperation; such as the production relating to biologic base, as well as labour- and financing tops occurring during agricultural work, furthermore defect of temporal continuity of incomes and outgoings. Financing agrarian corporations could be carried out in a multicourse system: it may be achieved either through inner aggregation or through state subsidy. However, *possibilities of inner aggregation in Hungarian agriculture are extremely narrow*, accordingly due to the fall of self-financing ability of agrarian corporations *an indebteding procession* began in this sector *in the years following the regime change*. *Proportion of lodged credit in this sector represented 5 percent symmetry in the credit files of national economy* in 2006. An agricultural credit file loaded with huge rate of short-term debts with unflattering structure grew by the end of the decade of 1990.

**3.2 Characteristics of Fund- and Capital Construction of Joint Agricultural Corporations**

Developing fund construction requires intense prudence and deliberation; if not succeeding in keeping in conformity the expiry of foreign funds drawn in and the return of resorts financed by them may cause destruction of liquidity status. High proportion of own fund within long-term funds shall increase financial stability of the corporation. Changes occurring in fund- and capital structure of corporations are illustrated by *figure 1*.

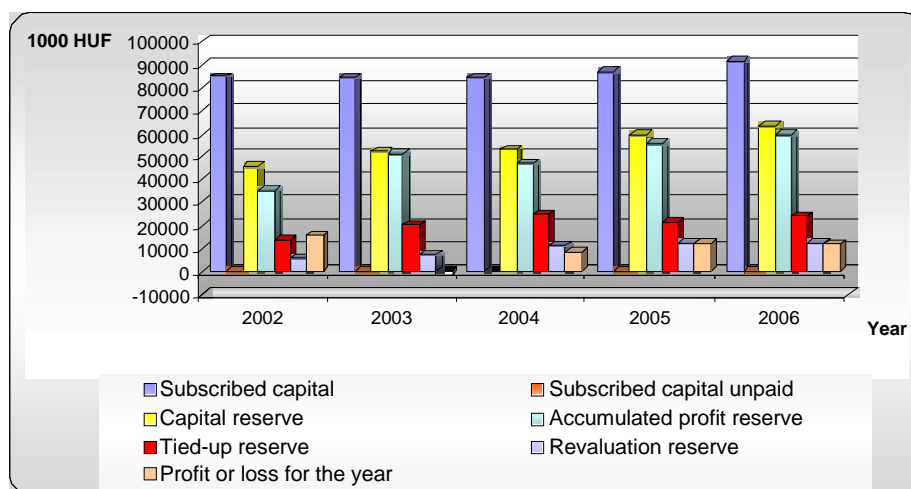


**Figure 1: Fluctuation of Fund Construction Between 2002-2006.**  
 Source: Own calculation based on AKI database



Following the fluctuation of equity proportion it shall be reportable that continuous, unflattering, and regressive tendency of long years seems to have been broken in 2005, as compared to the bottom of 53,5% in the year 2004. the proportion reached 56% after a gradual rise by 2006. In consideration of long- and short-term liabilities proportion shift occurred significantly positively in the first half of the period under subject, but from 2005. it turned negative again. *One of the reasons for regression of short-term liabilities is the conversion of short-term debts to long-term; the other reason shall be the 60 milliard forints credit consolidation allocated to agriculture in 2002.* The year 2005. is worth of special consideration as it brought significant change in the fund construction of corporations. After continuous regression for years, *proportion of equity in corporations raised first in this year – partly due to narrow possibilities of lodging credit.* However, along with this, the positive direction of *the credit files’ realignment to – thanks to credit consolidation and the conversion of liabilities – long-term credit files, finished.*

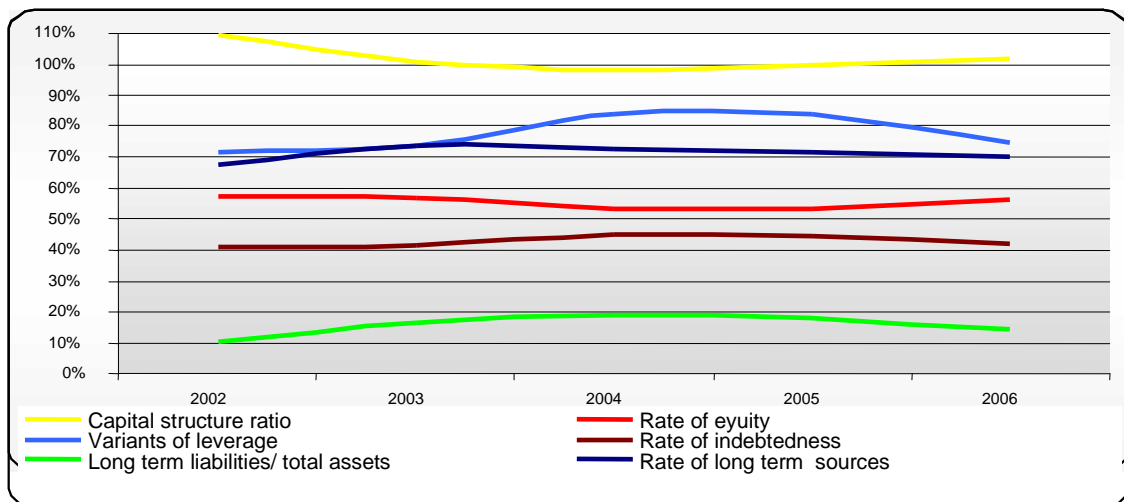
Due to the analysis of parts of equity (*Figure 2.*) it became clear that average value of joint businesses’ equity raise about 22 percent compared to 115 million forints in 2002, thus reaching the volume of 140 million forints. In this group the largest part is *represented by share capital, capital surplus and outcome surplus, of which total proportion is 80% of total files of equity.* Through analysing by size I proved that the larger the plant size is, the higher the raise of equity shall be compared to the year 2002: at small size category it shall be 4%, at medium it shall be 20% and at large category it shall be 27%. I found that *owners registered less and less capital stock from outcome surplus* which means extended caution in connection with figuring the future and taking risk by owners.



**Figure 2: Split of Equity According to Data of Testworks**  
Source: Own calculation based on AKI database

*High proportion of raise of liabilities' value against contractors, that can be monitored among short-term liabilities, – and that, representing 20-30 percent of total debt on the average, has raised about 60 percent as compared to the year 2002. – may attract attention to huge liquidity problems of agricultural corporations. I monitored variation of solvency according to this. Evaluating liquidity acid test bears especially great importance in consideration of agricultural corporations, which means monitoring current assets reduced by stock. This is because most of *current assets are realised in stocks* in most farms that work in agrarian sector. Rate of acid test was under 1 during all the period, which means that value of current assets reduced with stocks is not any more able to afford short-term liabilities.*

Fluctuation of some capital structure indices counted out of testwork data is demonstrated in *Figure 3*.



**Figure 3: Variation of Capital Structure Indices in 2002-2006.**

Source: Own calculation based on AKI database

According to found results the followings should be emphasized among the tendencies occurring in fund- and capital structure of joint agricultural corporations operating in Hungary.

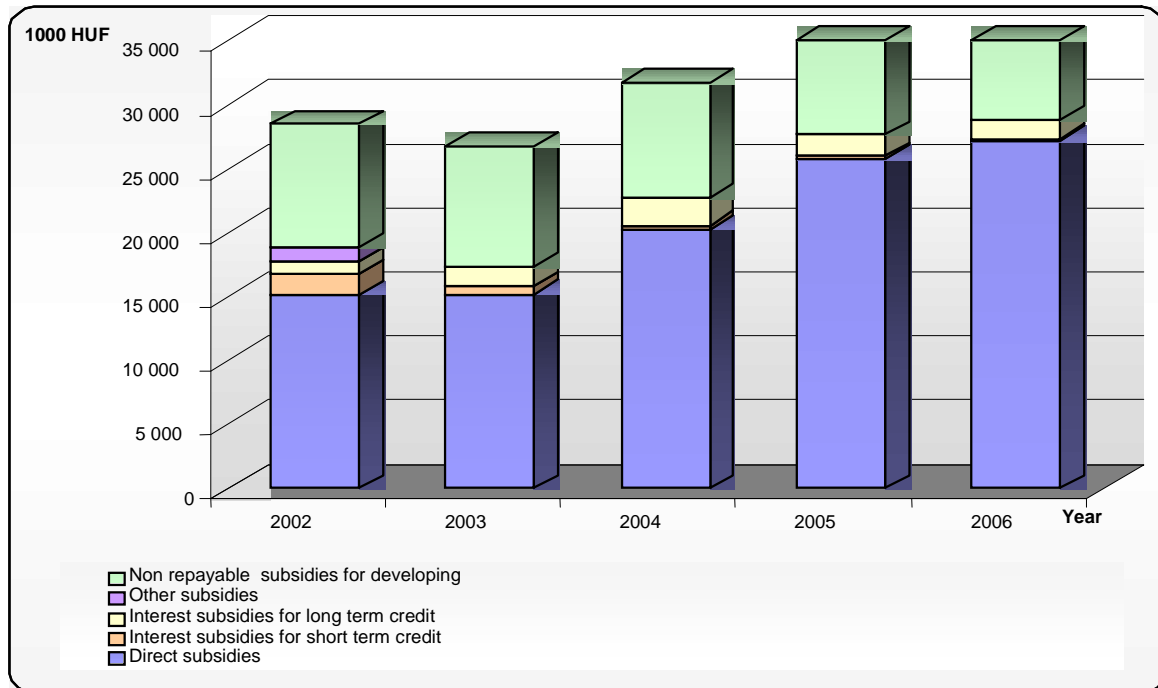
- Average rate about 57% of equity/total funds index that measure capital strength of corporations reduced to about 53% by the year 2004. thanks to the fact that due to doubling the total of other long-term credits, value of funds raised around 13 percent in a single year. However, from the year 2004. on account of narrowed possibilities for lodging credit, proportion of equity started gradual raise.
- In connection to above, leverage index of corporations, – viz. proportion of

liabilities compared to equity – as compared to 71% in 2002. raised to 84% by the year 2004. then from there, due to diminution decreased to 74% by 2006.

- Rate of capital supplies, that illustrates the correspondence of permanently engaged assets and equity, fluctuated around 100 percent in the beginning of the period under subject which shows that total quota of invested assets – moreover even some of the current assets – is financed by own funds and there is no need of having resort to foreign capital. However, inasmuch as equity proportion of joint businesses fell 3 percent degrees by 2004. thus proportion of capital supply reducing this year for the first time under 100 percent (98%), accordingly there was need for foreign funds too for financing invested assets. Estimating capital supplies it shall be important to notice the significant function of land as a kind of mean of production, of which a remarkable amount may be taken for rent so could not be detected in properties of a corporation. However on the other side, expected outputs must be paid as resorted foreign funds just like the usage fee of foreign funds given free run in money capital, the interest. Capital supply of corporations under research was best in the case of large size farms in all five years.
- Decreasing tendency of permanent capitals' proportion related to total capital, that occurred from 2004., represents that time of equity's raise could not compensate the rate of the raising of short-term liabilities.

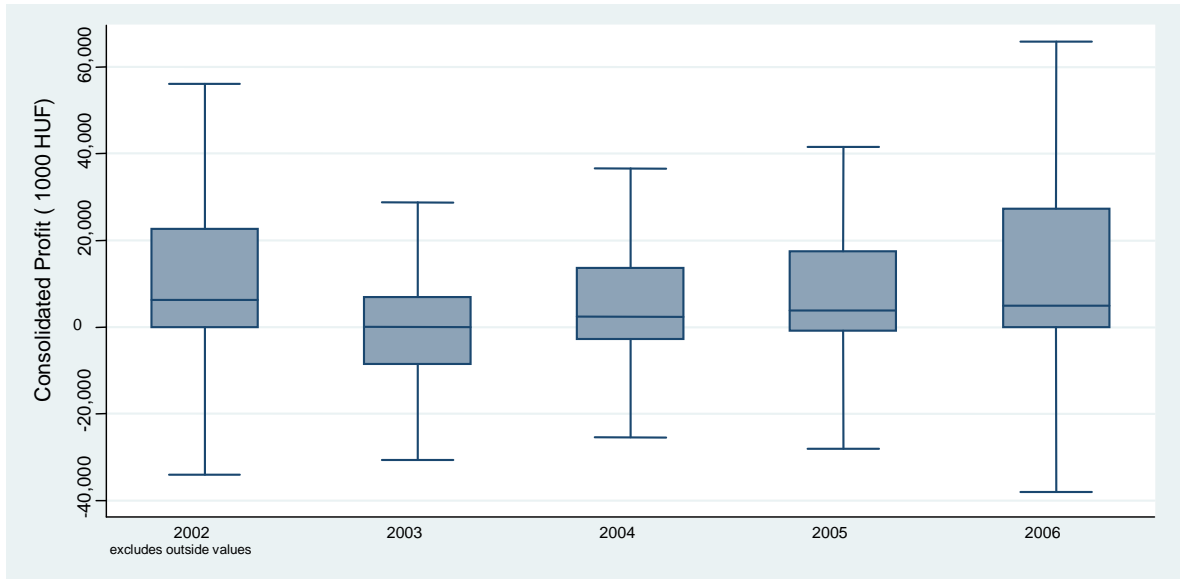
Analysis of fund construction pointed that: in connection with making out the credit proportion occurring in consideration of agricultural corporations at around 45 percent, attention must be drawn to that, although a small rate of indebtedness reduces the risk going together with contracting, still it means that most of the farmers are compelled to set activity to self-financing ability. Through research of capital structure by plant size, I stated that the larger the plant size is the greater the raise of equity shall be from year to year. Furthermore, profitability conditions of those corporations, which are managing with less foreign capital, are notably more favourable to those in which liabilities' rate are high. Corporations in which producing could be financed mostly from equity were able to finish a profitable year on the whole even in 2003. Greater size means higher capital efficiency, that is to say enlarging plant size shall be a necessary condition for more efficient operation.

*Subsidies fill a great part in financing structure of agricultural corporations. Total average rate of subsidies coming into a single plant raised 31 percent as compared to the first year of the period in subject (figure 4.)* Tendency coming off in variation of interest subsidies followed the realignment process in liability structure, within which interest subsidies of short-term credits during 5 years dropped to 0,3% from almost 10% at the beginning. Analysing subsidies splitting according to plant size, it is assessable that *the greater the plant size is, the higher the subsidy volume belonging to it is.*



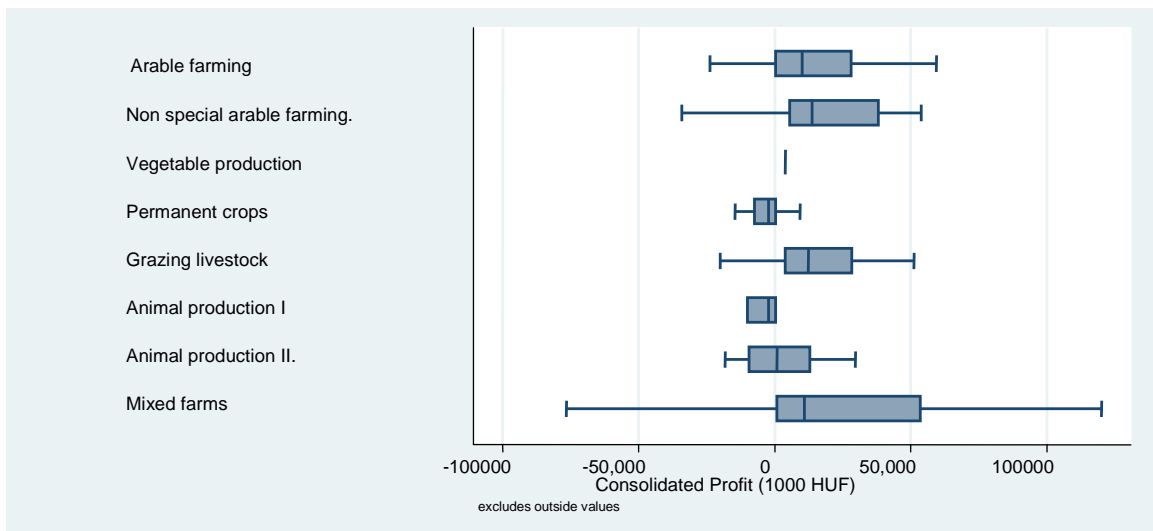
**Figure 4: Variation of Subsidies for Agricultural Corporations in 2002-2006**  
Source: Own calculation based on AKI database

In the course of analysing results of farms it marked out that efficiency of corporations is mainly determined by the *activity of the plant*, which efficiency in the five years, showed profit all along. Influence of financial operations' results may neither be forgotten; it has realized deficit in every year with decreasing tendencies since 2004. In the back, on the one side there are interests with falling rates due to narrow possibilities of coming at credits, on the other side, according to re-investment of years' incomes, there are lessening liabilities in line with raise of equity. I stated that scatter of results is fairly high (figure 5.) For example in 2006, according to consolidated profit, 24% of corporations were in deficit; an average of 5,4 million forints throughput was made by a single corporation. There are corporations with profit and with loss in every single group of size; of those having deficit proportion is highest in small size category (48%), while in medium and large size category is 26% in each.



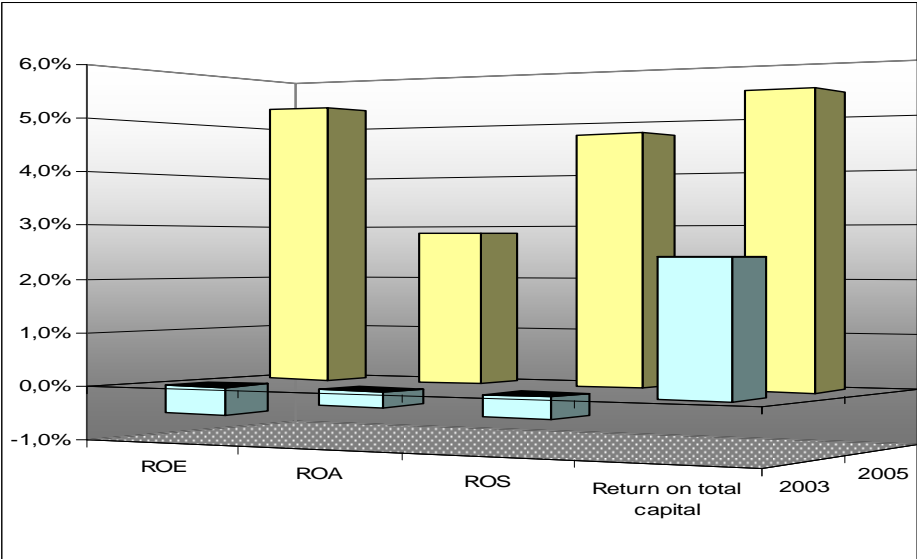
**Figure 5: Boxplot Diagram of Consolidated Profit of Corporations in Subject**  
 Source: Own calculation based on AKI database

Making classification of plants by the direction of activity, I found that proportion of deficit reaches highest rates at the plants keeping animals that consume grape, fruit and general forage (66-66%). Due to weighted average of balanced throughput, undoubtedly vegetable growers on the field bear the most favourable income conditions, though the scatter of result is high, for instance while in 2006 average index rate is 26°751 thousand forints, still 50 percent of plants do not reach 11 million forints, and still in the case of 25 percent of them, balanced throughput rate varied under 3,2 million forints (*figure 6.*)



**Figure 6: Variation of Consolidated Profit Depending on Activity Orientation in 2006**  
 Source: Own calculation based on AKI database

Through profitability indices, I settled that profitability of equity on the whole of the years analysed do exceed the profit in proportion with revenues, which still surpasses profit in proportion with assets. A great proportion of depreciation due to unflattering weather conditions in the year 2003, as well as favourable income situation in the year 2005. when highest profit was reached by agricultural corporations in the years of object (*figure 7.*).



**Figure 7: Variation of Profitability Indices**  
 Source: Own calculation based on AKI database

Whilst tracing fluctuation of fund construction, subsidies and throughputs, I got to the conclusion that: *large plant size economies’ plant throughputs are the best.* Reducing plant throughputs by subsidies, a tragic picture can be seen. Without subsidies, in the period under research all corporations in small, medium and large size category would have operated with deficit, thus *subsidy is entirely the only originator of throughputs.*

**3.3 Analysis on Capital Structure of Studied Corporations According to Compression of Index Numbers**

A simple analysis and classification of corporations based on financial index numbers recall much problem, since a calculation by emphasizing only a few index numbers goes together with loss of information, as even a single profitability level can be measured by many kinds of indices of profitability, liquidity or indebtedness. The assistance of multivariant mathematic and statistic methods open the opportunity to manage a large number of variants and to reveal internal coherency, so thus characteristics of the phenomenon shall be notable,

furthermore the index system will be appraisable. Because of this, in the followings, after compressing index number system within factor analysis, I classify and analyse testworks with the help of cluster analysis, so that I could present a more extensive idea of their property, financial and income situation.

**Hypothetical:** *After compressing index number system, homogenous groups can be made in the entire model, which open further possibilities of analysis on fund and capital structure, making analysable the co-movement of certain corporations as well as the existence of balanced performance of corporations.*

The goal of factor analysis performed is the comparison of corporations with the assistance of financial indices, as well as labelling and ranking according to their internal and external funds and profitability. During the course of analysis a three-factor solution came clear, which three factors take 90% of the information originally covered by 11 variants, therefore general loss of information while generating factors could be registered low. After defining the factor number I performed maximal presumption analysis with certain factor number. Best definability of factors was possible by Varimax rotation. According to the process, generating these three factors could be found acceptable:

- The first factor (main factor) is the factor for external funds and belonging debt obligations, which includes the following variants: total fund, obligations, short-term liabilities, received subsidies and payable interests. The factor keeps 45 percent of all information changing in the model.
- The second factor is the factor for self effort, which takes 29% of information. The variants of leverage, profitability of equity and revolution of equity come under the factor's variants.
- The third factor is the factor for profitability that covers 26 percent of information. The factor consists of the profitability of total capital, the index of profit in proportion with the assets and the index of profit proportion.

Applying results of factor analysis I performed cluster assay. During classification process I made an effort for a maximal homogeneity being assured in certain groups that are generating during clustering. For this, due to evaluation of the dendogram obtained by the assistance of the method Ward, which is a hierarchic process, while applying the non-hierarchic k-median process the generation of four clusters seemed to be reasonable. I typified each cluster with the help of the generated factors and according to the characterization I ranked them by

average rates of index numbers that mark them. While evaluating, I paid great attention mainly on the clusters involving the most companies, inasmuch as though groups involving few companies do affect the mean, they generally only involve the few companies with extreme rates.

Evaluating average performance of each cluster in 2002-2006, I found that for corporations of group 1., along with great funds strength a leverage rate over 1 was common, which highly exceeds the average, moreover a very strong obligation of interests and furthermore negative results reflecting deficit in management were common. The 2. cluster could be described as very high profitability indices, as high taxed throughputs, as leverage indices lower than average and as higher fund rates (and within these as higher permanent fund proportions.) The 3. cluster consists of corporations reflecting deficit in operation with much less property than average, much lower proportion of foreign capital. The companies of the 4. cluster are plants having less fund strength than average, which are specified as very high home funds proportion and very low leverage, and in the case of which efficiency and profitability indices are far over average rates.

I seek to reveal the connection between the size of members' of each group, corporation form and producing structure. Considering corporations of the first and the second group it can be clearly laid down that these with rates over 40 EUME go under the "large" and "extremely large" size category of the typology system of AKI, however plants under 8 EUME are part of the third group. In the case of categories according to sizes defined by SFH it is reportable that 82% of companies with rates over 80 million forints SFH belong to the 1. and 2. clusters, whilst 96% of plants under 25 million forints SFH make up the 3. and 4. clusters. In the consideration of activity organisation it is remarkable that grape, fruit and planter farms come under the 1. and 2. group, though 2. cluster is mostly framed by farms growing plants. According to the form of corporations it became clear that limited partnerships mostly create the 3. cluster, while 90% of shareholder groups came under the 1. and the 2. cluster.

*After finishing researches it is assessable that even in corporation groups formed following the concentration of financial index numbers that describe corporations' performance, negatively orienting connection seems to be proven between leverage and profitability, however co-motion within a group could have not been noted obviously, yet every single cluster could be described as similar characteristics all along the period in matter.*

### **3.4 Capital Structure Attached to Profitability**



In scope of relation analysis I looked into the factors defining capital structure, the existence of connection between index numbers describing it and the strength of this connection as well as how an existing connection could be described and expressed. I meant to test the correctness of the following pieces of hypothetical:

**Hypothetical I.:** *Rates of capital structure are in functional connection with the main parameters describing financial and income situation of agricultural corporations.*

**Hypothetical II.:** *A certain combination of chosen balance items (variants) could serve an explanation for the fluctuation of profitability indices.*

Thus I performed regression analysis of studied database on the base of two starting point. In one case I was trying to find the answer for *what influence the capital structure indices, which may describe fund structure the best and are chosen by me, take on the financial and profitability situation of the corporation;* whilst due to the second calculation I was looking for the answer for *which of the variants filling a part in development of capital structure is in functional connection with the fluctuation of profitability indices.*

Of the results of relation analysis for instance the connection between the profit in proportion with assets and funding items could be mentioned, which are described in table 1. It is clearly visible that profit in proportion with assets is in strong, negative connection with the proportion of credits lodged from owners in total capital; a change of 100 percent degree of that proportion would lower the rate of profit index by 27,3 percent degrees. Similar to credits lodged from owners, the studied index is also in a negative way of correspondence with proportions of long and short-term liabilities, however in the case of the latter the correspondence is not significant. Index number of fitting to the regression equation (R-square) is 0,41 that is to say the calculated model explains 41 percent of variance.

Results of further calculations also confirmed: *fund structure proportions take serious effect on the variation of profitability.* Symmetry of equity shows positive connection between profitability indices and the fluctuation of liquidity, moreover the *raise of foreign capital proportion* on the whole *goes together with the lessening of taxed throughputs.*

**Table 1: Regression Analysis of Asset-proportioned Profit**

	SS	szf	MS			
Model	0,35731357	4	0,0893284	N=192		
Residual	0,52048588	187	0,0027833	F (4,187)=32,09		
Total	0,87779946	191	0,0045958	Prob > F = 0,0000		
				R <sup>2</sup> = 0,4071		
				Adj. R <sup>2</sup> = 0,3944		
				Root MSE = 0,05276		

ROA	Coef	Std.Err	t	P> t	95% Conf.Int.	
Accumulated profit reserve	0,062473	0,0151783	4,12	0,000	0,03253	0,092416
Loan from owners	-0,2728433	0,0409874	-6,66	0,000	-0,3537	-0,19199
Long term liabilities	-0,0564566	0,0347335	-1,63	0,106	-0,12498	0,012063
Short term liabilities	-0,1098727	0,0259791	-4,23	0,000	-0,16112	-0,05862
Const.	0,0636366	0,0104536	6,09	0,000	0,043015	0,084259

Source: Own calculation based on database of testwork system

### 3.5 Definition of Capital Structure Proportion Describing Effective Management of Agricultural Corporations

After having reviewed the connection of capital structure and profitability, in the followings I am looking for the answer whether in the studied 5 years should be a kind of capital structure considered to be general, due to which it could be stated that it couples to management producing profit or deficit instead. I plan to test the correctness of the following hypothetical:

**Hypothetical:** *According to joint agricultural corporations researched, (specifically to orientation of activity or to size in certain cases) a sort of proportion is detectable between foreign capital and equity as well as at credit files, to which its profiting connects.*

To confirm this hypothetical, conventional statistic methods were not adequate since according to several variants drawn in the analysis, tests of both normality analysis and scatter homogeneity marked damages of adapted conditions; this is why I searched my idea through cutpoint analysis. I defined a proportion between foreign capital and equity which could be regarded as this: that proportion or a rate over it goes together with deficit in operation. I found that *only 40 percent of corporations producing deficit and at the same time only 12 percent of those producing profit have leverage index over the rate 1,55.* It also could be

appreciated remarkable that almost 100 percent of corporations producing profit bear index numbers under 2,5 however, one out of five of those producing deficit have higher rates than this (*table 2.*) I performed the same statistic process in the consideration of the liabilities' proportion within fund construction and on this I found that *more than 60 percent of studied corporations producing profit operate credit proportion under 40 percent* however, almost 70 percent of those producing deficit have rate proportion barely over this. Due to my results *break-out possibilities for corporations already producing deficit are tightly limited, banks found granting credit to them is risky; moreover they have slight opportunity for development and by this flare and profiting operation by self strength.*

**Table 2: Specified Comparison on Distribution of Leverage**

c	F1(c)	F2(c)	F1-F2	Korrekt%	Phi	Coef.	Khi Fish	p	Adj. p
-52,24	0,015	0,000	0,015	50,7	0,10	0,00	Fisher	0,3490	
-15,39	0,030	0,000	0,030	51,5	0,14	0,00	Fisher	0,1206	
-3,43	0,045	0,000	0,045	52,2	0,17	0,00	Fisher	0,0413	
0,55	0,313	0,368	-0,055	52,7	-0,05	1,28	0,572	0,4496	1,0000
1,55	0,612	0,880	-0,268	63,4	-0,31	4,65	Fisher	0,0000	0,0003***
2,54	0,791	0,960	-0,169	58,4	-0,27	6,34	Fisher	0,0005	0,0041**
3,54	0,836	0,976	-0,140	57,0	-0,26	7,99	Fisher	0,0007	0,0056**
4,54	0,881	0,976	-0,095	54,8	-0,20	5,51	Fisher	0,0175	0,1403
5,53	0,940	0,984	-0,044	52,2	-0,12	3,90	Fisher	0,1857	1,0000
6,53	0,955	0,992	-0,037	51,8	-0,12	5,81	Fisher	0,1231	0,9848
7,53	0,970	0,992	-0,022	51,1	-0,08	3,82	Fisher	0,2792	1,0000
9,52	0,985	0,992	-0,007	50,3	-0,03	1,88	Fisher	1,0000	
10,51	0,985	1,000	-0,015	50,7	-0,10	....	Fisher	0,3490	
47,37	1,000	1,000							

Source: Own calculation based on AKI database

### 3.6 Empiric Test on Fulfilment of Capital Structure Theories

Corporation decisions relating to capital structure are the observed of all theoretical observers although corporation leaders make capital structure decisions in very few cases while expressly aspiring to the achievement of some optimal structure. This is because management mostly make decisions of production, market and finance and all these take direct effect on all-time capital structure of corporations. I was searching for the answer whether statements of certain theories on capital structure should be realized considering corporations examined by me.

**Hypothetical:** *Certain statements on capital structure are effective on agricultural corporations as well, however, capital structure policy of corporations cannot be described extensively by any models.*

According to corporations I studied, negative connection proven between profitability and leverage refers to the realization of hierarchy theory however fundamentals of conversion theories do not come true. Positive connection being between consistence of assets and proportion of long-term credits though confirm the very grounds of conversion and agent theories.

Through empiric test of a statement of hierarchy theory of Myers-Majluf that refers to the internal sequence and the sequence among foreign funds, I tested whether it comes true that if investment possibilities of corporations are almost the same, amount of their internal funds and credits should be in negative connection. The more the available own funds are, the less foreign funds are needed to attain certain investment policy. Based on researches of **ÁBEL-ÖCSI (1999)**, in the course of the analysis I adapted leverage index for estimating foreign funds however, to show internal funds I adapted the rate calculated by them, which relates to total balance of corrected operation flow. This index number does not include interest obligation in connection to foreign funds since this would cause inconvenient negative correlation effect considering rate of leverage. Method of calculating corrected operation flow is the following: taxed throughput – dividend + amortization + interests.

Leverage calculated from data of a certain year appears as dependent variant of regression equation, furthermore as an explaining variant aside from the index number of corrected flow, corporation size is also brought in the model, which I defined as a natural based logarithm of income. Estimation results of equation describing leverage are shown by *table 3*.

**Table 3: Estimation Results of Equation Describing Leverage**

	Coef.	p-value
Const	0.4490257	0,019
Adj.operating cash-flow	-1,79678	0,0005
Size	-0,02344	0,239

Source: Own calculation based on AKI database

Due to the found equation, index of corrected flow is significant and goes with a negative indication which matches my idea, however connection between corporation size and leverage cannot be proven statistically. Although indication of this index reflects negative rate that was hoped, this result could be caused even by coincidental fluctuation as belonging high P-rate shows. However it is clear that proportion of external sources relating to own capital lessens around 1,8 percent degrees in the case of 1 percent degree raise of flow related to total balance. Negative relation between held back profit and leverage, which is detected due to the regression equation, tallies the hierarchy theory of Myers-Majluf that sais corporations would finance firstly from own funds and would only after this take the opportunity of lodging credit.

Through empiric test of capital structure theories I confirmed the theorem which is already stated also by technical literature: *none of them are realized comprehensively* in the process of the changing of capital structure at corporations I studied. However the hypothesis of hierarchy theory does come true, which finds that *corporations would finance activity of corporation firstly using own funds and only after this would turn to the opportunity of foreign funds.*

Results of my research draw attention to the fact that conscious management of funds and amplification of the ground of own capital are indispensable conditions for better profitability status of the sector and for achieving competitive production.

#### 4. New and Novel Results of the Dissertation

I summarize new and novel results of my dissertation as the followings:

1. Applying several mathematic-statistic methods (simple describing statistics, factor- and cluster analysis) I performed a multi-angle fund- and capital analysis in consideration of agricultural corporations, in which evaluation of results of classification processes confirmed influential function of the relation of own capital and foreign capital, of subsidies, of corporation size and of phasing activities on throughputs and efficiency.
2. Through relation analysis I prove: capital structure proportions take serious effect on the fluctuation of profitability. Symmetry of own capital (also proven statistically) shows positive relation of variation of profitability indices and liquidity, furthermore, raise of proportion of foreign capital couples with diminution of taxed throughputs: influence of its payable interest flow in taxed throughputs.
3. With the assistance of cutpoint analysis (also either specifically to orientation of activity and size) I defined a proportion of foreign capital and own capital which if reached or exceeded, may lead to operation producing deficit.
4. In the course of empiric test on grounds for capital structure theories considering agricultural corporations, by statistic methods (correlation- and regression calculation) I prove that in the processes of developing capital structure of plants *none of the theoretical models are realized comprehensively*. However, while analysing comprehensive realization of models I managed to define factors of certain condition systems that do come true considering plants of agrarian sector.

## **5. Practical Utility of the Results**

For the sake of facility of valid executive decisions, economic professionals must be aware of possible effects of decisions of capital structure considering property-, financial and income situation of the corporation. Understanding this is exactly that might be assisted by my dissertation, which aims the analysis on fund- and capital structure of agricultural corporations and which is based on the database of AKI Testwork System.

Main results of my aims intending to prove the relation of capital system and profitability as well as to reveal coefficients determining profitability might be useful not only for other researchers but also for practise. Understanding determining coefficients may develop decisions and related awareness of financial executives, thus contributing to lower capital expenditure and therefore a more profitable and optimal operation of a company. Knowing these factors shall draw the attention of decision makers to the routine of other companies, therefore amending financial choices too. Proportion of foreign capital and own capital has been defined – specified by activity orientation and plant size – in the essay, which proportion being reached or exceeded might lead to operation producing deficit. Results of calculations may give assistance for financial professionals for making decisions however, it must be emphasized that evaluating results should be performed at all times according to certain case and belonging conditions. This is true especially considering a sector as agriculture, where risking factors (i.e. weather) that take great suspense cannot be set aside. In the course of my aims of an empiric test on agricultural relation of capital structure theories I was searching for whether capital structure decisions of plants could be described based on the assumptions of any model. It is proven that priority of the function of financing own capital may not be recent news however, understanding relationships surrounding financial decisions are undoubtedly useful for decision makers. Results described in this essay also make great opportunities for other researchers to proceed to new researches. This is because a further research of this subject still carries much possibility just to mention the extension of the analysis on more years, drawing other new studied indices into the model, sector-neutral analysis or international comparison of the results found. Suggestions presented in the essay formulate turns of changes as well as possible solutions.

## 6. Publications in Subjects of the Dissertation

### Parts of academic book / textbook in Hungarian language:

1. **Herczeg, A.** – Bács, Z. – Fenyves, V. – Grasselli, N. – Nagy, A. – Szűcs, I.: (editor: Bács, Z. – **Herczeg, A.**): *Managing and Accountancy of Non-profit Organizations*, Expertise Publisher Office, Budapest, 2005. ISBN 963 9553 61 1 0,25  
0,15
2. Bács, Z. – Boros, A. – Darabos, É. – Ertsey, I. – Fenyves, V. – Galicz, K. – Grasselli, N. – **Herczeg, A.** – Jacsmenik, Gy. – Kárpáti, L. – Kondorosi, F.-né – Koch, K. – Kotormán, A. – Kozár, L. – Nagy, A. – Orbán, I. – Rózsa, A. – Tábori, M.: (editor: Bács, Z. – Fenyves, V.): *Finance and Accounting of Corporations*, Expertise Publisher Office, Budapest, 2005. 35-52.p ISBN 963 9553 64 6 0,15
3. Bács, Z. – **Herczeg, A.**: Capital Structure of Agricultural Corporations Attached to Productivity Efficiency. In: Needs of Capital and Effectiveness of Agriculture. DE ATC Department of Agrarian Economy and Rural Development, Debrecen, 2005. 66-71. p. ISBN 963 472 896 0 0,075
4. **Herczeg, A.**: Capital Investment and Depreciation in Agricultural Corporations. In: From Agrarian Innovation to Social Asymmetries. Debrecen, 2006. p.344-348. ISBN 963 9274 95 X 0,15
5. Bácz, Z. – Dékán, T. – Orbán, I. – Fenyves, V. – **Herczeg, A.** – Jacsmenik, Gy. (2007): In: *Accounting, Financing, Taxing* Editor: Bács, Z. – Orbán, I. Expertise Publisher Office Budapest 126-134, 142-152 p. ISBN 963 9553 646 0,15
6. **Herczeg, A.**: Taxing Influence on Development of Capital Structure in Corporations. In: Teaching Aims of Accounting, Tasks, Methods, and Accounting. Debrecen, 2007. p.63-68. ISBN 978-963-473-026-2 0,15

### Institutional publication excerpt in foreign language

7. **Herczeg, A.**: *Analyse the Financing Structure of Agricultural Enterprises in 2002-2006*. Applied Studies in Agribusiness and Commerce Vol.3. Number 5-6.2009. AgroInform Publishing House 91-94.p. HU-ISSN 1789-221X 0,4

### Institutional publication excerpt in Hungarian language

8. **Herczeg, A.**: The relation between capital structure and profitability by corporate farms. Economy, 2009 (under printing) 0,2
9. **Herczeg, A.**: Analysing the relation between variation leverage in corporate farms. Acta Agraria Debreceniensis, University of Debrecen Journal of Agricultural Science, 2009 (megjelenés alatt) 0,2

### Discourses fully published abroad in foreign language:

10. **Herczeg, A.**: *Analysing the Optimal Capital Structure of the Agricultural Enterprises in Hungary*. The Third International Scientific Conference, Lithuanian University of Agriculture, 8-10. November, 2007. 0,3
11. **Herczeg, A.**: *Analysing the Capital Structure by Agricultural Enterprises with Financial Ratios*. Agrarian Perspectives XVI - European Trends in the Development of Agriculture and Rural Areas, 18-19. September, 2007. 0,3
12. **Herczeg, A.**: *Review of Capital Structure in Hajdú-Bihar County*, In: 2nd Green Week Scientific Conference. Berlin, 16-18. January, 2008. <http://www.mace-events.org> 0,3

### Discourses fully published in Hungary in foreign language:



13. <b>Herczeg, A.:</b> <i>Theories of optimal capital structure</i> , XI. Juvenile Academic Forum, Section Economy – Agrarian Economy. Georgikon Department of Agricultural Economy of University of Veszprém, 24. March, 2005.	0,15
14. <b>Herczeg, A.:</b> <i>An Examination for the Capital Structure of the Agricultural Enterprises in Hungary</i> , IV. Academic Conference of Ferenc Erdei, Kecskemét, 27-28. August, 2007.	0,15
15. <b>Dékán, T.- Herczeg, A.:</b> <i>Variance analyses in cost controlling</i> , XI. International Academic Days, Gyöngyös, 27-28. March, 2008.	0,075
<b>Discourses published in Hungarian language with summary in foreign language:</b>	
16. <b>Herczeg, A.:</b> <i>Capital Structure as a Reason for Efficiency and Lagging at Agricultural Corporations</i> , In: Agrarian Economy, Rural Development and Agrarian Informatics II. (AVA II.) International Conference, DE ATC Department of Agrarian Economy and Rural Development, Debrecen, 7-8. April, 2005.	0,1
17. <b>Herczeg, A.:</b> <i>Nature of Accounting Depreciation and its Part in Forming Expenditures at Joint Agricultural Corporations X</i> . Academic Days of International Agrarian Economy, Gyöngyös, 30-31. March, 2006.	0,1
18. <b>Herczeg, A.:</b> <i>Capital Structure and Production Efficiency at Agricultural Plants</i> , WEU International Conference, Mosonmagyaróvár, 6-7. April, 2006.	0,1
19. Bács, Z. – Darabos, É. – <b>Herczeg, A.-Orbán, I.:</b> <i>Specifics of Accounting Subsidies</i> . In: Agrarian Economy, Rural Development and Agrarian Informatics III. (AVA 3.) International Conference, DE ATC Department of Agrarian Economy and Rural Development, Debrecen, 20-21. March, 2007. (CD file 10 pages)	0,025
20. <b>Herczeg, A. – Bács, Z. – Orbán, I.:</b> <i>Research and Analysis on Capital Structure of Joint Agricultural Corporations in Hungary</i> . In: Agrarian Economy, Rural Development and Agrarian Informatics III. (AVA 3.) International Conference, DE ATC Department of Agrarian Economy and Rural Development, Debrecen, 20-21. March, 2007. (CD file 10 pages)	0,03
21. Kotormán, A. – <b>Herczeg, A. – Bács, Z.:</b> <i>Challenges of Liquidation Process in Hungary and in Bulgaria</i> . In: Agrarian Economy, Rural Development and Agrarian Informatics III. (AVA 3.) International Conference, DE ATC Department of Agrarian Economy and Rural Development, Debrecen, 20-21. March, 2007. (CD file 10 pages)	0,03
22. <b>Herczeg, A. – Dékán, T.:</b> <i>Analysis on Capital Structure of Joint Agricultural Corporations in 2002-2006</i> , XI. International Academic Days, Gyöngyös, 27-28. March, 2008.	0,05
<b>Discourses published in Hungarian language without summary in foreign language</b>	
23. <b>Herczeg, A.:</b> <i>Comparison of Possible Processes of Evaluating Assets Due to Different Accounting Systems</i> . In: Spring Wind 2005. National Association of PhD Students– Spring Wind Conferency 2005. Section Economic. Debrecen, 5-8. May, 2005. 160-164	0,05
<b>Total:</b>	<b>3,635</b>