

**SZENT ISTVÁN UNIVERSITY  
GÖDÖLLŐ**

**PhD DISSERTATION  
THESIS STATEMENTS**

**POSSIBILITIES OF SELF-FUNDED DEVELOPMENT IN AGRICULTURE**

Written by

**Belovecz Mária**

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**Name of PhD School:**                    **Management and Business Administration PhD School**

**Science branch of School:**        **Management and Business Administration**

**Head of Doctoral School:**        **Dr. Lehota József**  
**professor**  
**MTA doctor**  
**Institute of Business Studies**  
**Szent István University**

**Consultant:**                                **Dr. Borszéki Éva**  
**professor emeritus**  
**Institute of Business Studies**  
**Szent István University**

.....  
**Approved by Head of Doctoral School**

.....  
**Approved by Consultant**

# 1 INTRODUCTION

## 1.1 Background and relevance of the topic

Hungary has favourable natural conditions for agricultural production. Over time, the agricultural sector has undergone a series of structural and organisational changes: farm size and production always reflected the needs and priorities of a given era. These changes and transitions are worth studying so that lessons and consequences may be extracted for future optimisation. The agricultural sector serves the double purpose of providing income for rural families as well as producing the necessary goods for the population as efficiently as possible. In many cases, the two aims may hinder each other: efficiency is usually directly proportional to farm size, due to the optimal use of machinery and more advanced technology, which requires significant investments that are usually not available for small-scale farm owners. Technologically advanced solutions also cut the need for low-skilled labour force.

The agricultural sector usually attracts and requires significant involvement of the national governments because of its key role in employment as well as providing vital resources for the population. Products must comply with an ever stricter list of requirements and more specific market demands. In addition, there is pressure to produce high quality goods at a competitive price as there is significant competition both at the national and international level.

Prior to the accession to the EU, the Hungarian agricultural sector was the beneficiary of significant amounts of subsidies aimed at upgrading and expanding the machinery and technology used on farms. The aim was to increase the competitiveness and efficiency of agricultural holdings so that they could survive in the unified market after accession. After accession to the EU, however, subsidies for investments decreased significantly, resulting in funds being used merely for maintenance. The only exception is 2009, when there was a surge in investment subsidies as a measure to tackle the economic crisis.

Accession to the EU had a significant impact on the economy of Hungary, including the agricultural sector. Farmers need to operate within a different legal and organisational framework. Hungary is now subject to and a beneficiary of the Common Agricultural Policy. Subsidies include income support and rural development measures (including subsidy for investments).

The current version of the Common Agricultural Policy (CAP, 2014-2020) allows for the creation of a complicated and individualised system of subsidies for the member states; however, the budget has decreased and further cutbacks are expected in the future.

The main aims of the Hungarian agricultural sector are as follows:

- Improving the competitiveness of agricultural production and food processing;
- Viable and sustainable development, rationalisation of land use;
- Rural development.

These aims are still work in progress, and the increased independence in the allocation of funds for specific purposes is expected to have a positive impact.

If previous subsidies had been used for long-term goals and investments into the sector based on a sound concept and clear vision, then the outcome would have been a modernised and upgraded, competitive agricultural sector that is capable of generating sufficient profit to cover the

necessary investments, therefore, becoming independent from outside subsidies. As this scenario did not happen, it is necessary to find new ways to transform the agricultural sector into a self-sustaining system. My dissertation aims to cover this topic in detail.

## **1.2 Aims of the dissertation**

My research has the following aims:

1. Review the relevant literature regarding investments and the financial situation of the agricultural sector in Hungary, with a special emphasis on the changes and impact of agricultural policies.
2. Analysis of individually owned and corporate farm sizes and activities regarding:
  - a. Profitability and its relationship to structure of capital available.
  - b. The role of income support in generating income and in covering expenses. This reflects on the viability of farms without subsidies.
  - c. Analysis of investments, their value and source of capital, with an emphasis on the role of subsidies.
  - d. Analysis of paying dividends and its effects.

Eventually, it is expected that with the help of the above analyses, we can answer the questions about the possibilities of self-funded development and profitability across the different types of farms, as well as the contributing factors and the possible drawbacks.

Hypotheses:

1. The competitiveness and viability of the Hungarian agricultural sector did not increase. Income was generated by the increased access to direct subsidies; with efficiency being marginalised at the same time.
2. Different policies and expectations for individual and corporate farms do not contribute to development and improved competitiveness.
3. Profitability and dividends depend on farm size and farm type, not on ownership structure.
4. Investments depend heavily on investment subsidies..

## 2 MATERIALS AND METHODS

My research and analysis was based on ten years' of data (2001-2010) generated at the Farm Accountancy Data Network (FADN) managed by the Research Institute of Agricultural Economics. This network has representative data covering the entire agricultural sector in Hungary, including privately owned and corporate farms; therefore, it is possible to obtain relevant data based on farm size, ownership, and produce type.

After 2010, the data classification and categories were modified, making it incompatible with previous systems. At the same time, area-based subsidies complemented by national resources accounted for 100%; meaning that subsequently sums paid were dependent on the forint / euro exchange rate. By taking into consideration data from the period 2001-2010, it was possible to make comparisons of the era prior to and after the accession to the EU based on ownership, size, and production structure.

In order to make comparisons readily manageable, subsidies were converted to 1000 HUF / hectare of agricultural land. However, two further factors need to be taken into consideration:

- In the case of smaller farms (whether individually or corporately owned) it is customary to withhold part or all of salaries that should be paid based on hours worked; therefore, it is difficult or impossible to make appropriate comparisons with larger scale farms regarding the ratio of salaries paid / income generated. Instead, income is distributed as dividends. For the purposes of this research, however, it is irrelevant whether workers and owners are paid by the hour or in the form of dividends, as my research focuses on the ratio of income that is reinvested back into the farm and the purpose or aim of these investments.
- Figures generated for a hectare of agricultural area are not necessarily relevant for animal production II (granivores), as it is not a requirement that the feed originates from their own area.

National data as well as individual farms and corporate farms are divided into six categories based on their produce. 1. Arable farming (cereal, rapeseed, sunflower, potatoes, etc) 2. Animal production I. (grazing livestock: cows, cattle for fattening, sheep, equidae) 3. Animal production II. (granivores: pigs, poultry etc.) 4. Permanent crops / plantations (vineyards, fruit, hops) 5. Vegetable production (vegetables, ornamental plants and nurseries) 6. Mixed farms: other farms that cannot be classified into the previous types. Categories 1-5 are required to generate at least two thirds of their Standard Gross Margin (SGM) from the source indicated.

For the purposes of size, both corporate and individual farms are divided into four groups: under 15 hectares, 15-40 hectares, 40-100 hectares, over 100 hectares.

The preliminary analysis was run on the national database, i.e., including all types of farms irrespective of size and ownership. In the subsequent steps, separate analyses were conducted for individually owned and corporate farms as well. Next, different types of farming and sizes were considered as well.

Analysis aimed at the opportunities for self-financed investments and developments was conducted in several steps. First of all, it was necessary to establish whether the individual groups made a profit at all, and the extent of investments. Second, it was analysed whether a positive balance and profit would have been possible at all without income supplement subsidies. In the end, the ratio of profits invested back into the farm was observed, along with policies of paying dividends.

Profitability was analysed using the Modigliani – Miller theorem. Cost of capital ( $r_A$ ) is calculated as the sum of cost of equity and cost of debt, weighted by their relative percentage. (Borszéli, 2004, 2007/b):

$$r_A = D/V * r_D + E/V * r_E,$$

if:  $D/V$  = percentage of financing that is debt  
 $E/V$  = percentage of financing that is equity  
 $r_A$  = the cost of capital for an all equity firm  
 $r_D$  = cost of debt, interest paid / debt %  
 $r_E$  = cost of equity, profit after taxes/equity, %

Investments from external sources (such as loans, subsidies) contribute to increasing the yield of equity and investments from own sources, following the formula  $r_A > r_D < r_E$ .

Based on that the rate of the equity ( $r_E$ ) depend on the profitability of the assets ( $r_A$ ), the capital split ( $D/E$ ) and the difference between assets profitability and the rate of the external source ( $r_A - r_D$ ).

It is worth increasing the external source percentage until the rate of the equity increases, of course calculating with the fact that the risk and the rate also increase with the higher proportion of the external source. (Borszéli, 2004, 2007/b),  $r_E = r_A + D/E (r_A - r_D)$ .

My analysis extends to the income supplement type agricultural subsidies in the given period. Subsidies that are accounted as "other resources" were taken into consideration as they have a direct impact on income. Subsidies from EU sources only reached western European levels in 2013; however, supplementary subsidies from national sources resulted in subsidies reaching levels the same as in former states by the year 2010. Therefore, data from this year and subsequent years calculated in euros may serve as basis for comparisons and long-term conclusions. The proportion of income supplementing subsidies in all incomes is also evaluated. Profits before taxes were considered as it only takes into consideration equity, capital from different sources, income and profit.

The difference between profits before taxes and income supplementing subsidies may reflect on the levels of income that would have been possible without said subsidies, and was named "adjusted profit". This figure reflects whether subsidies generated extra income for corporations or merely covered their expenses and investments. As financing expenses and investments did occur in the data, the ratio of "adjusted profit" and income supplementing subsidies shows to what extent and what percentage the EU subsidies ended up merely covering up gaps in financing.

The change of the investment is observed using the gross investment results.<sup>1</sup> Gross investment is decreased by the investment supports and the long term (investment) credits to get the own source within the total source of the investment<sup>2</sup>. Own source is divided into amortisation and other own source. Besides, net investment was also observed<sup>3</sup>. The write-off is calculated using a rearranged version of the net insurance formula. The correlation between investment and investment support is also analysed.

Farmers may use their profit after taxes to pay dividends or in order to make new investments into their venture. Thus, profits used on site increase the value of equity, contributing to the increase in the value of the holding's assets, which might be used to cover running expenses or

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<sup>1</sup> Increase of Fixed assets in given year (cash)

<sup>2</sup> Given year long term (investment) credits minus previous year long term credits.

<sup>3</sup> Net investment = gross investment – write-off – amortisation

finance new investments. Therefore, keeping in mind the future of the enterprise, it makes a significant difference if and to what extent profits after taxes are recycled and reinvested back into the venture. According to Brealey&Myers (2011), policy on paying dividends is actually making a choice between holding back profits and paying dividends or issuing new shares. In order to explore this aspect of businesses, the analysis includes examining the relationship between ownership type, structure, size, production line on the one hand, and paying dividends policies on the other. A difference in profits after taxes requires different dividend paying strategies, in theory at least. With this hypothesis, the analysis was focused on attempting to identify distinct dividend paying strategies for different types of agricultural ventures.

Dividends paid per hectare of agricultural land was calculated as the difference between income before taxes and after taxes. This figure reflects the minimum amount of dividends paid, but it does not take into consideration any dividends that might have been paid from previous savings. Furthermore, a figure calculated by dividing dividends paid by income after taxes reflects upon the role and use of dividends. If the figure exceeds 100%, it means that savings were used to pay dividends, and on the balance sheet actually the given year produced net loss. It does happen occasionally that dividends are paid despite a negative income before taxes (loss), in these cases, the above figure does not apply. Profit / loss after taxes figures show whether the dividends paid exceed profits. In case of a negative figure, there are no funds left for investments or running operations.

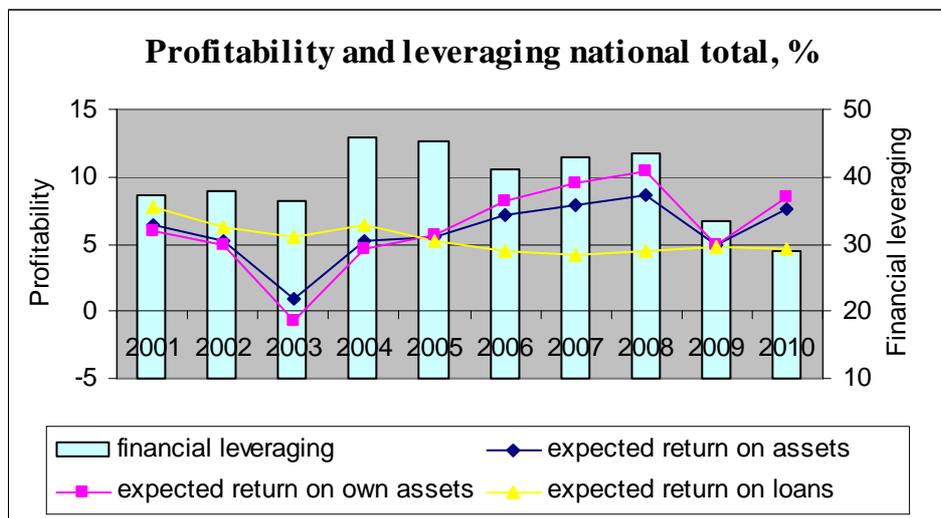
My analysis includes a survey of the distribution of profits before taxes to the owners, to the holding, and to the state budget itself in the case of holdings of different sizes and ownerships. Taxes are paid to the national budget, dividends are paid to the owners, and profits after taxes and dividends are left over for running the venture. It needs to be mentioned that the state budget benefits not only from taxes paid directly, but also from fees, local taxes and other sums paid and deducted as costs in the balance sheet.

### 3 RESULTS

According to the relevant Farm Accountancy Data Network figures, fixed assets increased by 8% annually in the given period. At the same time, however, net revenues from sales increased only by 2.43% annually, with wholesale prices increasing at a higher rate, therefore, it can be concluded that production and sales decreased. Profit after taxes increased by 13.21% exclusively as a result of income support subsidies which were entered into the accounts as income. Subsidies increased by 19.38% on average, whereas profits showed a lower rate of improvement; therefore, it is evident that the overall efficiency of production decreased.

#### 3.1 Results of the analysis of profitability, investments and dividend policy

At the national level, on the whole, it can be concluded that accession to the EU in 2004 brought about significant changes in the profitability of agricultural ventures. Starting from 2005, return on assets started to climb, meaning that return on equity increased and return on outside sources decreased (Figure 1.).



**Figure 1: Profitability and leveraging national total**

Source: Calculations based on FADN data

The range of data for net revenue from sales per hectare do not show significant variations (9.76%); other income has much wider range. Similarly, profit after taxes also varies widely (61.5%), which reflects unsatisfactory management skills and the need to improve profitable operations. These figures reveal that agricultural subsidies both before and after EU accession have a key role: **any kind of profit in the sector is solely owing to agricultural subsidies and support systems.**

Immediately prior to accession to the EU and during the economic crisis, there was a significant rise in the gross value of investments, owing to increased support for investments. Net investments were already high right before accession and then decreased steadily and significantly. However, owing to policy and CAP strategy changes (2007.2013), investment subsidies have been on the rise since 2007. Due to the economic crisis in 2009, there were opportunities to access a wider range of investment subsidies, and the net value of investments rose sharply.

The low amount of profit left over after taxes naturally limits the opportunities for investments using equity. At the same time, the rate of dividends paid at accession to the EU and in the subsequent two years were stagnating (below 50% up to 2006 and slightly exceeding 50% starting from 2007). In 2003, when the entire agricultural sector produced a loss, dividends were paid from equity.

It is important to note that corporate farms deviate from the national average at some points. Increase of fixed assets was higher than the national average. Net revenue from sales also exceeded national average. Profit before and after taxes match the national average; however, balance sheet earnings are higher as a result of a higher rate of reinvestments. Consequently, the rate of equity / total capital improved and debts decreased.

At the same time, individual farms did not develop their fixed assets at the same rate, and net revenue from sales only increased by 1.75% annually. Balance sheet earnings only grew by 3.13% per annum, due to the higher rate of paying dividends. As a result, increase of equity is slower and debts increased on the whole.

The value of gross investments increased in the case of corporate farms but there is a similar tendency with individually owned farms. In the latter category, gross investments prior to accession to the EU were higher than subsequently, including the year 2009, which had boosted investment subsidy programs. Investments in individually owned farms lag behind the national average and amount to less than half of the investments made by corporate farms ever since accession.

In the case of corporate farms, profits before taxes, after taxes, and dividends usually stayed below the national average. However, in the years 2002, 2004, and 2007-2010, balance sheet earnings exceeded the national average, meaning that more of the revenue was recycled back into developing the farms. Of course, this means that the rate of dividends paid is also significantly lower in the case of corporate farms than the national average. These are actually signs of a more conscious and refined financial policy, paving the way for development and investments from own sources.

**Table 1. Ratio of dividends paid, %**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
National average	28.45	46.31	N/A <sup>4</sup>	47.25	45.68	41.00	61.47	52.42	67.14	58.39
Corporate farms	10.47	12.09	N/A	23.26	28.53	24.43	28.14	16.49	38.93	25.15
Individual farms	38.46	72.27	N/A	60.68	56.04	50.03	77.42	79.69	77.60	72.64

Source: calculations based on FADN data

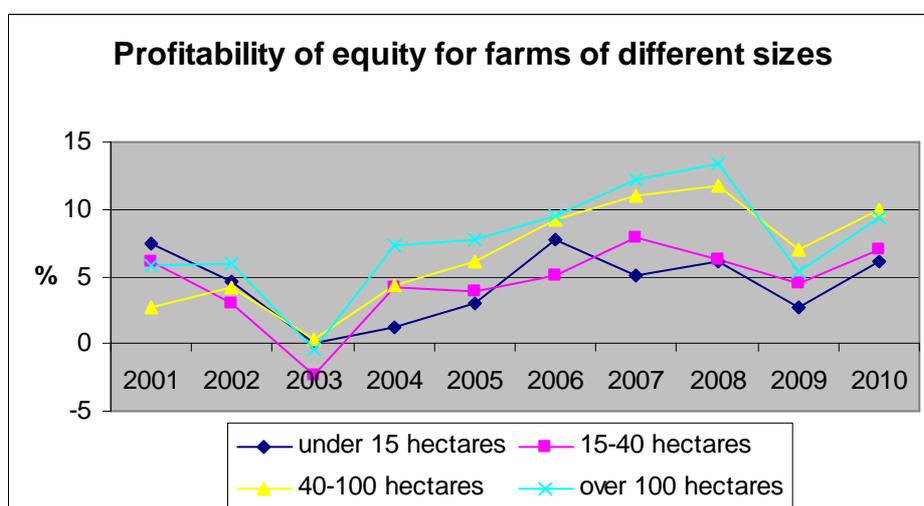
In the case of individually owned farms, profit before and after taxes exceed the figures for corporate farms in every single year. Both sets of data show an upward trend. Due to the drought and economic crisis, there was a temporary stall in the years 2002, 2003 and 2009. Dividends paid also seem to show an increasing trend, with a few exceptions, and its ratio exceeds dividends paid by corporate farms significantly (see Table 1). Dividends paid exceeded 50% with the exception of the year 2001, and even exceeded 70% in certain years (2002, 2007, 2010). On the whole, individually owned farms prefer paying dividends to paying wages due to differences in taxation. However, this decreases the opportunities for development from equity.

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<sup>4</sup> Not available

### 3.2 Results of the analysis of profitability, investments and dividend policy for different farm sizes

In smaller sized farms, the ratio of equity is higher than in the case of large farms; however, there is more fluctuation in the actual ratio over the years. Farms under 15 hectares increase their fixed assets at the lowest rate (7.55% per annum), for mid and large sized farms, the rate is similar (8.76-9.07%). Net revenue from sales increased most in mid-sized farms (40-100 hectares), with a comparatively higher rate of fluctuation though. The same applies for profit after taxes as well: small sized farms demonstrate lower rates of improvement and higher variance than farms over 40 hectares. In farms smaller than 100 hectares, equity ranges from 72 to 87%, whereas in the case of farms over 100 hectares, the corresponding figure is 59 to 72%, due to the fact that owing to their financial background, large farms have easier access to external resources (loans). Profitability of equity has been increasing across the board, with the exception of the two critical years (2003 and 2009). The figures reveal though that profitability of equity is higher in large farms. First of all, large scale farms are able to produce goods and use their fixed assets more efficiently, and on the other hand, they are able to access external resources more cheaply.



**Figure 2 : Profitability of equity for farms of different sizes**

Source: Calculations based on FADN data

The value of assets per hectare is inversely proportionate to farm size, whereas the opposite is true for the extent of debt. The smaller the farm, the higher the ratio of debt. Farms over 100 hectares have the lowest ratio of debt. Corporate cost of capital is relatively higher compared to smaller farms sizes; the figure is only below 6% in the crisis years of 2003 and 2009. In the case of individually owned farms over 100 hectares, leverage is higher than in the case of smaller farms; however, they also realised higher returns. The maximum of corporate cost of capital was 14.01% and the maximum return on equity 17.15% (both in the year 2007).

Subsidies and supports were on the increase for each category. After accession to the EU, differences in subsidies per hectare decreased.

Investments vary according to farm size (see Figure 2). For small-scale farms (under 15 hectares), investments were on the increase, with a temporary lapse in 2005. Investment subsidies stagnated but then picked up again. Investment subsidies are not directly proportionate to the gross value of investments, as in certain years (2004, 2007), investments did increase in spite of a dip in subsidies, and vice versa (2005, 2010), or subsidies increased at a much higher rate than investments (2009). In farms under 15 hectares, net investment was only realised in the

year 2009, meaning than on the whole, no actual investment and development took place in this farm category over the ten years under scrutiny. Farms ranging from 15 to 40 hectares are similar as well. For farms of 40-100 hectares, gross value of investments are directly proportionate to subsidies. Net investments started to occur over the past few years only. For farms over 100 hectares as well, gross value of investments and subsidies are directly proportional, meaning that investments are directly dependent on subsidies. Investment debts have been on the increase, with the exception of 2004 and 2007. Starting from 2005, external sources are used at an increasing ratio to cover investments. For large farms, it has been possible to make conscious and well planned decisions regarding investment strategies.

**Table 2: Investments for different farm sizes**

	<b>Unit.: 1000 Ft/hectares</b>								
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
<b>Farms under 15 hectares</b>									
Gross investment	111.9	126.6	152.1	84.9	90.6	101.7	129.2	148.3	135.7
Net investment	-1051.5	-1118.7	-1418.0	-39.6	-58.5	-35.2	-25.0	4.8	-6.8
<b>Farms 15-40 hectares</b>									
Gross investment	52.9	67.0	54.8	53.9	48.3	32.3	32.0	49.1	28.5
Net investment	-402.8	-641.1	-532.0	-12.9	-20.0	-22.9	-18.4	9.0	-16.8
<b>Farms 40-100 hectares</b>									
Gross investment	72.0	66.5	63.1	43.9	31.6	43.8	60.5	65.4	41.7
Net investment	-291.7	-385.3	-497.7	-0.7	-10.4	3.9	-0.9	27.0	0.5
<b>Farms over 100 hectares</b>									
Gross investment	65.8	77.6	59.3	64.4	62.5	71.9	85.9	92.0	84.9
Net investment	-271.5	-293.4	-331.4	13.9	5.9	23.1	25.8	36.5	17.7

Source: Calculations based on FADN data

In the case of small farms, net investments dropped to less than half in the years after accession to the EU and only started to increase again in 2008, but still there has been no net investment to speak of. There is significant fluctuation over the years. Equity was only used for investments in the year 2009.

In the case of mid-sized farms (15-40 hectares), gross investment and investment subsidies are significantly higher than the national average, with the exception of a few years, however, there is a steady decreasing trend. There is no strong correlation between investment subsidies and gross investments. For mid-sized farms 40-100 hectares, both figures are over the national average as well, but to a lesser extent. Net investment was only realised in 2007 and 2009. In the case of individual farms, the ones over 40 hectares managed to bring about net investments and develop their production.

Farms over 100 hectares are most representative of the national average. This is the only category among corporate farms that shows an increase in gross investments after accession to the EU. Starting from 2005, equity has also been used to cover investments to an ever increasing degree. There is no strong correlation between net investments and investment subsidies.

Profit after taxes per hectare increased at the highest rate in the case of farms 40-100 hectares. Due to differences in dividend policy, profit after taxes and balance sheet earnings do differ. Farm size and dividends paid are inversely proportionate: small farms below 15 hectares pay multiples of the dividends paid by large scale farms. Table 3 shows the relevant figures for dividends paid in the different farm categories.

**Table 3: Dividends paid in the case of different farm sizes**

Unit.: %

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>National average</b>										
Under 15 hectares	34.82	62.59	4021.66	164.26	112.00	62.31	135.01	105.73	148.34	100.71
15-40 hectares	37.77	100.13	N/A	69.47	43.39	46.70	83.74	81.38	81.05	79.28
40-100 hectares	46.06	83.78	781.72	55.17	47.15	38.34	64.07	63.06	60.54	59.94
Over 100 hectares	14.94	19.51	N/A	25.07	31.66	31.45	38.42	34.28	49.42	41.03
<b>Corporate farms</b>										
Under 15 hectares	11.34	35.74	N/A	N/A	185.12	34.74	N/A	21.56	124.13	366.09
15-40 hectares	2.48	731.10	N/A	37.59	N/A	70.39	71.75	N/A	N/A	N/A
40-100 hectares	N/A	9.33	N/A	N/A	34.14	44.13	25.60	1.95	46.01	17.70
Over 100 hectares	10.94	10.89	N/A	17.44	24.08	22.07	22.89	16.35	35.07	22.23
<b>Individual farms</b>										
Under 15 hectares	37.98	64.03	162.37	102.22	109.00	64.82	109.09	133.30	149.77	98.02
15-40 hectares	40.39	98.50	423.66	78.90	37.55	45.02	85.10	76.15	78.21	75.01
40-100 hectares	45.53	98.57	163.81	48.30	47.64	37.92	65.87	71.71	62.04	63.51
Over 100 hectares	32.09	47.82	83.35	37.82	43.39	46.09	59.93	64.23	62.04	62.98

Source: Calculations based on FADN data

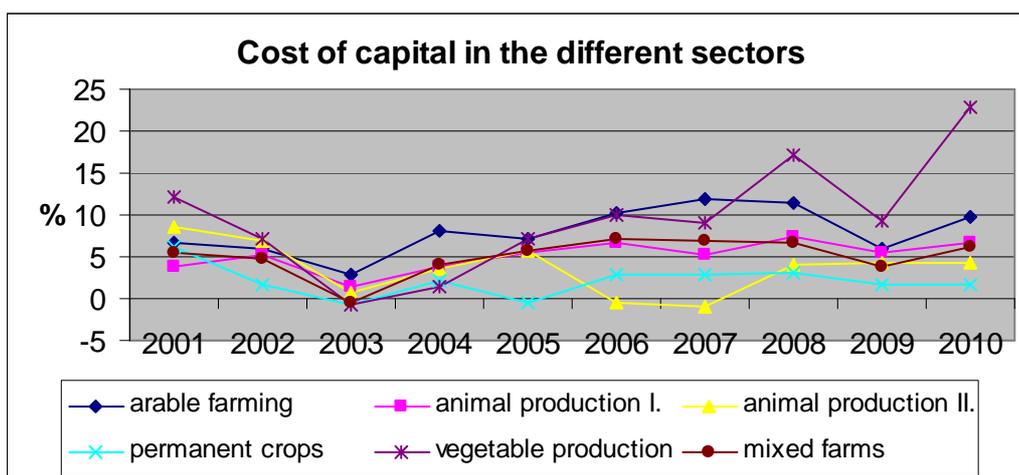
In farms below 15 hectares, dividends paid exceed 100%, whereas for farms from 15 to 40 and 40-100 hectares, the corresponding figures are 80-84% and 60-64% respectively. In other words, the majority of the profit is paid as dividends and only a smaller proportion is recycled and reinvested back into the farm. For farms over 100 hectares, dividends paid are 40% of the profit, on average, so a higher amount is reinvested.

The differences in dividend policy can be attributed to tax regulations. Dividends are taxed to a lesser extent than wages, therefore, owners can access money out of the venture with more favourable conditions this way. At the same time, high dividends paid also reflect short term planning and strategies. Corporate farms show a higher range of wages and dividends across the different sizes than individual farms. Corporate farms over 40 hectares reinvest a significant proportion of their profits, as they strive to remain independent and avoid loans. Similarly, larger individual farms also pay a lesser amount of dividends.

### 3.3 Profitability, investments and dividend policy in different farm types

Different types of farms have a good equity ratio on average, ranging from 50.11% to 89.39%. Corporate farms have a lower ratio in all farm types (41.74-78.80%), whereas the relevant figure for individual farms is 66.53-93.56%. In the period under scrutiny, there is an upward tendency in arable farming, animal production I. and permanent crops, and a downward tendency in animal production II., vegetable production and mixed farms.

When comparing cost of capital across the different sectors, the highest yields after accession to the EU were presented by the vegetable sector (See Figure 3.), followed by arable farming, animal production I., and mixed farms. The least profitable sectors are permanent crops and animal production II., the significant drop in the production of the latter may be attributed to its low profitability.



**Figure 3: Cost of capital in the different sectors**

Source: Calculations based on FADN data

Individual and corporate ventures in the arable farming sector have similar cost of capital and capital yields. The animal production I. farms started to pick up in 2005, when capital yields reached 7.18 to 9.18%. There was no significant difference between individual and corporate farms. In the case of granivores, the cattle stock has been decreasing gradually whereas sheep stock has increased over the years. Animal production II. (granivores) farms have higher debt than animal production I. farms, which can be attributed to the fact that in 2005 and 2008, significant fixed assets had to be installed to conform to EU regulations.

Corporate cost of capital and capital yield fluctuate significantly; for example, the figures from 2008-2010 correspond to half of the set of figures from 2001. Pig farms underwent significant downsizing as well as restructuring (a large number of small-sized pig farms closed down). In the past 3 years, corporate cost of capital as well as capital yield are steady at 4%. Low profitability also holds true for permanent crop farms, dropping from 6% at the beginning of the test period to 2% in 2009-2010. Corporate farms have a lower cost of capital than individual farms, which may be due to differences in technology or more stable channels of wholesale.

As for vegetable farms, cost of capital has been increasing since 2005, with peaks in 2008 and 2010. Individual farms are close to the national average whereas corporate farms fluctuate more. Capital return on equity is usually around 8-12%, but reached 22% and 32% in 2008 and 2010. These two years were characterised by high capital investment and loans in the sector. For mixed farms, cost of capital is around 6-7%, with no difference between corporate and individual farms, with a balanced structure of source of capital.

Investments also vary according to farm type. Gross investments, subsidies and net investments are presented in Table 4.

In arable farms, there are fluctuations and a downward tendency in both gross and net investments. Out of all the farm types, this one has the lowest gross investment per hectare. Animal production I. farms have the most balanced set of gross investments data, which seem to be largely independent from subsidies. Animal production II. farms show an increase in gross investments up until 2005 and then fluctuations until the present day. 2009 was a peak year for subsidies; however, there is no correlation between gross investments and subsidies. For permanent crops, there were significant subsidies prior to accession to the EU, but then the figures dropped to a minimum by 2009 and 2010. As for vegetable farms, net investments and gross investments fluctuate and present a negative figure in five years out of all the investigated period. Mixed farms have been successful in as much that even after accession to the EU, they

were able to increase their gross investments. This is largely due to the fact that their subsidies are almost equivalent to pre-accession levels, and they received outstanding support in the year 2009. In 2004-2006, there was no net investment, otherwise the figures fluctuate widely.

**Table 4: Investments in the different farm types**

**Unit.: 1000 Ft/hectare**

	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Arable farming</b>									
Gross investment	42,6	49.3	36.6	37.8	34.4	40.5	39.0	53.4	29.8
Investment subsidies	6.0	5.9	3.6	4.1	0.8	3.1	2.8	6.0	2.6
Net investment	13.5	17.3	1.3	3.2	0.4	8.6	6.1	22.2	-1.9
<b>Animal production I.</b>									
Gross investment	73.7	100.3	101.8	69.0	64.9	62.3	107.2	88.1	107.5
Investment subsidies	4.0	8.0	3.0	1.6	2.7	2.7	2.1	11.6	9.7
Net investment	14.2	15.6	21.0	-8.5	-6.2	8.8	46.5	18.5	26.6
<b>Animal production II.</b>									
Gross investment	380.3	596.8	592.6	658.7	536.8	309.86	706.8	440.0	439.6
Investment subsidies	34.4	24.8	5.4	22.5	26.8	8.2	14.0	46.7	46.6
Net investment	104.4	125.2	105.9	1.5	-258.5	-101.5	235.8	80.5	120.4
<b>Permanent crops</b>									
Gross investment	250.4	268.2	327.3	239.7	207.0	168.8	166.2	182.5	208.4
Investment subsidies	37.3	38.1	28.0	20.7	11.0	2.1	17.0	18.7	41.2
Net investment	90.0	65.1	116.0	-4.6	-79.1	-39.2	-101.5	13.0	0.9
<b>Vegetables</b>									
Gross investment	202.8	116.5	82.5	152.7	130.0	111.3	245.3	236.4	105.4
Investment subsidies	26.5	20.2	5.4	10.5	0.0	1.4	31.6	26.4	1.5
Net investment	-21.6	14.4	-95.2	16.6	-2.6	-40.6	39.4	54.1	-39.6
<b>Mixed farms</b>									
Gross investment	62.6	77.3	55.5	61.6	65.3	93.5	109.7	116.6	91.4
Investment subsidies	5.6	5.1	1.7	4.1	2.7	5.3	4.4	14.7	6.0
Net investment	11.2	15.0	-0.2	-1.7	-3.9	26.5	19.4	47.6	15.3

Source: FADN data

The characteristics of investments vary not only by sector but also by ownership. Generally speaking, corporate farms exceed national average regarding gross investments, net investments as well as investment subsidies requested. Correlation analysis showed that correlation above 0.5 was only present for arable farming and mixed farms in the case of corporate farms, whereas for individually owned farms, there was strong correlation in all sectors except for animal production I. (Table 5).

**Table 5 Correlation between net investments and investment subsidies, by farm type**

	Corporate farms	Individual farms
Arable farming	0.5874	0.8041
Animal production I.	0.2857	-0.1348
Animal production II.	-0.2214	0.5260
Permanent crop	0.2373	0.6379
Vegetables	0.4788	0.7364
Mixed	0.9010	0.6682

Source. Own calculations

Dividends paid vary by sector but all of them are increasing. In the examined period, the last four years (2007-2010) showed a significant rise in dividends paid, partly due to better profits and partly to increased subsidies. The ratio of dividends paid is high in every sector and even after accession to the EU, it has never dropped below 30%, moreover, it mostly exceeded 50%. In other words, most of the profit is removed from the venture and only a smaller proportion is reinvested. In the case of corporate farms, a significantly lower proportion is paid as dividends. In individually owned farms, dividends paid exceed 50% in each and every sector ever since 2007, and hardly ever dropped below this figure even beforehand. Based on these figures, only privately owned arable farms have the means to invest and develop from equity.

### 3.4 *Novel findings*

Below is a summary of the new findings revealed by my study, which mostly support the hypotheses.

**1) In the agricultural sector, if yields increase at a higher rate than revenue, it does not necessarily mean that production is more efficient, as the nature and amount of subsidies and supports influence the situation.**

In the period covered by the study, net revenue from sales increased by 2.43%. Profit before taxes increased by 12.55% per annum and profit after taxes by 13.21%. There is a discrepancy between the two figures due to changes in taxation. Balance sheet earnings increased by 6.59% on average. At the same time, subsidies increased by 19.38% per year on average, meaning that efficiency actually decreased considerably, contrary to expectations. It is important to point out that increased revenue from sales resulted from lower yields.

Naturally, there is a wide range of data and developments according to farm size and farm type to make up these average figures. Both before and after accession to the EU, subsidies were entered into the accounts as income. Subsidies continue to have a decisive role in covering running expenses, and profits are mostly possible only due to high amounts of subsidies. Such dependence on subsidies results in the farmers not being forced to compete, strive for efficiency; they are merely counting on subsidies to keep them afloat. Up until 2010, subsidies increased; due to exchange rates, the figures got even higher during 2010-14. However, stagnating and decreasing subsidies may be forecast for the future because of policy changes, so it is essential to improve efficiency in some way or form.

**2) It is necessary to have a more versatile approach to farms of different ownership regarding revenue and profitability, because of their widely differing policies and financial operations.**

On average, individually owned farms have higher yield per hectare and higher profitability than corporate farms. However, this is not due to differences in efficiency; merely a reflection that the owners' own labour input into the venture does not appear as wages in the accounts. In addition, they also tend to enter lower figures for depreciation. Very importantly, per hectare (area based) subsidies are still higher in the case of smaller sized farms, and individually owned farms are more likely to have smaller size. For larger sizes and the same farm type, there is smaller difference in profits according to farm type.

**3) Investment from equity is not directly dependent on profit after taxes or profitability, rather, it relies on balance sheet earnings and dividend policy. In this regard, there are differences according to farm size and farm type.**

The rate of increase in balance sheet earnings is well below the increase in profit after taxes, meaning that an ever decreasing proportion of earnings are reinvested into the businesses, and a higher proportion is used to pay dividends. Over 50% of profit before taxes is paid to the owners in the form of dividends, thus decreasing possibilities for development from equity. Development is fundamentally dependent on equity and resources available for investment. Dividends paid started to stagnate after accession to the EU, but they have been on the rise again since 2007 and have climbed over 50%.

There are differences, however, according to ownership structure: the rise of balance sheet earnings in corporate farms is triple the rate in the rise of the corresponding figure in individually owned farms. At the same time, the figures of profits after taxes do not show significant differences in the two types of farms. **Corporate farms reinvest over 60% of their profit into the business, which indicates conscious and responsible business decision and strategies. Because of taxation policies, individual farms tend to pay dividends rather than wages, which diminishes their ability to develop.**

Profits after taxes and balance sheet earnings vary because of differences in dividend policies. The smaller the farm, the higher the dividend per hectare. **Farm sizes are inversely proportionate to dividends paid by hectare of agricultural area. Furthermore, for all farm sizes, the ratio of dividends paid has been increasing.**

Very importantly, for the smallest farms, dividends paid tend to be higher than the earnings, meaning that they are using up savings from previous years to pay dividends. There is low correlation between earnings and dividends paid in the case of the smallest farms. **If farms under 15 hectares continue to take vital resources away and fail to reinvest earnings into the business, then they are losing their ability to stay operational in the long run.** Area based subsidies reached their maximum in 2010, meaning that simply keeping the farm afloat financially requires more capital and resources than is available.

Farm sizes and the amount reinvested into the venture are directly proportionate both for individual and corporate farms. **Corporate farms over 100 hectares have kept the ratio of dividends paid at a steady 22-24% since 2005.** There are also differences according to farm type. Arable farming, animal production I. and mixed farms are more likely than others to keep their balance sheets positive and reinvest a significant amount into their businesses.

- 4) Development using own sources is influenced by equity, equity ratio and profitability. Long-term and well-planned strategies to develop equity ratio were only observed in the case of larger sized farms.**

In the agricultural sector, equity is the main source in financing the businesses. The ratio of equity and debt has been improving gradually, with corporate farms having a faster rate of increase in equity and individual farms tending to get into more debt. Capital yields started to improve in 2005, contributing to a rise in return on equity. Yield of external resources have been under 5% since 2006.

These discrepancies between equity and balance sheet earnings seem to suggest that most increase is not due to investment using own resources but rather as a result of subsidies. Return on equity has been on the rise in every category, with exceptions in 2003 and 2009 (the crisis years). The data reveal that return on equity is higher in larger sized farms: they are capable of producing goods more efficiently due to their size and favourable use of technology and other fixed assets; in addition, they have better access to cheaper external resources (loans).

Considering data from 2010, equity ratio is rather steady across farms of different ownerships, and ranges (from high to low) as follows: permanent crops, arable farming, animal production I., mixed farms, vegetables, animal production II. In individually owned farms, animal production I. has the highest equity ratio, and arable farming drops down the ranks (these being the differences from the national average). Capital yields are the highest in the vegetable sector, if all data regarding cost of capital is considered after the accession to the EU, followed by arable farming, animal production I., and mixed farms. The least profitable types of farms are permanent crops and animal production II., leading to a drop in the number of such farms over the years.

- 5) **Investments are not result of well-planned business strategies, rather, they depend on the availability of investment subsidies, their schedule and scope. Most subsidies are still used to replace and repair existing hardware.**

Correlation calculations reveal that there is a strong relationship between gross investment and investment subsidies, whereas net investments and subsidies are not so tightly related, except for larger sized farms and certain farm types.

Farms under 15 hectares only managed to achieve net investments in the year 2009; in summary, **there was no development to speak of in this category in the ten year span of the study.** In the 15-40 hectare category as well, only the year 2009 shows positive net investment figures. The years 2007, 2008 and 2010 were more positive for farms of 40-100 hectares, as they achieved net investment at these times. **In the case of individual farms over 40 hectares, they managed to make investments and thus not only keep operational but also move forward by achieving positive net investment figures in the second half of the time frame in this study.** As for farms over 100 hectares, gross investments and investment subsidies are correlated, meaning that **investments depend on subsidies.** Loans taken out to finance investments keep increasing with a few exceptions; however, there is a growing trend of using other own resources to finance investments starting from 2005. **This is the only farm size that manages to keep making net investments and present a growing tendency.** Generally speaking, **the net value of investments as well as the subsidies used exceed the national average for these farms.**

As for farm types, there is a wide variation in the figures of investments, and it usually depends on the available subsidies whether or to what extent they fluctuate. Prior to accession to the EU, significant funds were redirected into each farm type in order to enhance their competitiveness; however, these sums dropped sharply after accession, with the exception of certain years of crisis, when extra funds were poured into keeping the sector afloat. The effect of dividend policies is also visible in the extent of investments: investments are only possible if a higher proportion is recycled and if the venture has funds of its own as well.

- 6) **In the years ahead, subsidies may only change as a result of changes in the exchange rate, which may even result in a drop in subsidies. Consequently, no further increase in yields and profit is to be expected without boosting profitability.**

In 2010, area-based subsidies reached their maximum levels. Any further fluctuations in the sum of subsidies paid is solely owing to changes in the exchange rate. Subsidies have "maxed out" and it is no longer possible to increase earnings (from savings) without increasing efficiency as well.

## 4 RESULTS AND RECOMMENDATIONS

In 2010, area-based subsidies reached their maximum levels. Any further fluctuations in the sum of subsidies paid is solely owing to changes in the exchange rate. Subsidies have "maxed out" and it is no longer possible to increase earnings (from savings) without increasing efficiency as well.

In the period covered by this study, only one year (2001) shows figures that indicate profits achieved in the agricultural sector even without the numerical input from subsidies. On the whole, any achievements or profits in the entire agricultural sector are solely a result of subsidies both before and after accession to the EU.

In the period leading up to accession to the EU as well as during the years of crisis, there was a significant increase in gross investments, especially as a result of investment subsidies. At the same time, loans taken out to cover investments also increased sharply. On average, any investment made was a result of either subsidies or loans. Investments correlate strongly with investment subsidies; they are not the outcome of long term strategic planning but rather a reflection of what and to what extent is being subsidised at a given time.

Development using equity depends on what percentage of profit after taxes is available to be reinvested into the venture. The ratio of dividends paid was stagnating around accession to the EU, stayed under 50% until 2006 and climbed well over 50% since 2007. More than 50% of profits before taxes are paid to the owners, which severely hinders the possibilities of development. It seems like many ventures do not even aim at trying to build long-term development goals and strategies.

The figures of gross investments are significantly higher for corporate farms than the national average. Investment subsidies lagged behind until 2004 but in subsequent years, the balance shifted and the figures started to exceed the average. Corporate farms had more investments and also benefitted from more investment subsidies as well than individual farms.

As a result of significant depreciation, net investment was only made in the year 2009 in farms under 15 hectares. There was no other development in this category in the time frame studied. Farms 15-40 hectares show a decrease in investment subsidies, with a few exceptions. As depreciation was generally higher than gross investments, with one exception, there is no development worth mentioning in this category either. Depreciation is on the decline.

As for farms 40-100 hectares, investments correlate strongly with investment subsidies. Net investments were made in 2007, 2009 and 2010. For the largest farms, gross investments and investment subsidies also correlate. Starting from 2005, they have had increasing access to other types of resources as well. This is the only category that demonstrates a growing tendency for conscious, strategic development.

The ratio of dividends paid is significantly lower in corporate farms than the national average. This paves the way for development from equity. Generally speaking, with a few exceptions, reinvestments from profit after taxes back into the farm exceed 60% in the case of corporate farms, which enhances the possibility of profitable developments.

Individual farms reveal a slower rate of increase in fixed assets, mainly regarding real estate, but also machinery, equipment and vehicles. The other large difference in net revenue from sales, which only increased by 1.75% per year on average. There is no significant difference in the rate of increase in profits before and after taxes; however, balance sheet earnings only expanded by

3.13% as a result of the high amounts of dividends paid. On the whole, equity increases slowly and debts also accumulated more. In spite of these facts, equity ratio is still more favourable for individual farms than for corporate farms. This conservative financing strategy has several drawbacks as well. Debt was below 21% of all capital in the case of individual farms, but exceeded 30% for corporate farms. Smaller farms boast a better equity ratio, but they tend to fluctuate more widely. Data show that larger farms have higher return on equity, due to their increased efficiency making use of machinery and equipment and also the easier access to better forms of loans.

For every size category, subsidies have increased significantly from 2001 to 2010: for small farms under 15 hectares, the increase was 3.76 fold, whereas the corresponding figures were 4.72 fold, 6.65 fold and 6.78 fold for 15-40, 40-100 and 100+ hectares farms respectively. This massive increase is thanks to accession to the EU. After accession, subsidies according to size started to vary less, but it is still a policy to keep higher subsidies for smaller farms. Subsidies keep increasing as the main source of income, as subsidies have increased more than net revenues from sales over the years. Profit before taxes is often less than income support subsidies, meaning that they are essential in keeping farms operational.

Due to different dividend paying policies, balance sheet earnings and profits after taxes vary. Farm size and dividends paid per hectare are inversely proportional. Dividends per hectare paid keep increasing for every kind of farm, though. Dividends per hectare are the highest in the case of the smallest farms, significantly higher than the largest farms. However data are distorted by the fact that different sizes of farms tend to focus on different sectors of agriculture.

Corporate cost of capital figures reveal that after accession to the EU especially, but also in general, the highest yields were achieved in the vegetable sector, followed by arable farming, animal production I., mixed farms, and at the other end of the scale, permanent crops and animal production II. Different types of farms tend to have similar figures of revenue per hectare, whether they are individually owned or have corporate ownership. Of course, raw figures of income are much higher for corporate farms, which tend to be larger and have larger yields. An interesting exception is animal production II.; corporate farms are more likely to produce their own feed, which may distort the figures significantly.

The role of subsidies is to increase profits or diminish losses; on average, the latter is significantly more prevalent. Only the vegetable sector seems to be capable of maintaining itself and producing profits even without the numerical input provided by the subsidies given.

In the time frame under investigation, corporate farms had above average gross and net investment figures and they benefitted more from investment subsidies. For farm types, investments vary widely in each year, depending on the subsidies available. Prior to accession, significant funds were available for each sector, which dropped sharply after accession, with the exception of crisis-mitigating investment subsidies in the year 2009.

Dividends paid vary by farm types but show an upward tendency. In the years 2007-2010, they increased sharply compared to the previous rate of increase, mainly due to increased yields and also partly because of increased subsidies. Corporate farms paid less than 50% dividends (fluctuating from 18 to 35%) and kept the majority of their profit after taxes as savings for purposes such as development. The highest ratio of dividends were paid by permanent crops and vegetables farms. Corporate farms pay dividends below average, whereas individual farms usually keep above 50%. Granivore farms, permanent crops and vegetables farms have paid dividends over 100% since the year 2007. Hence, only arable farms have the capacity to keep part of the profits to be reinvested. Generally speaking, the owners receive most of the dividends

in lieu of wages payments, which are taxed differently, and a lesser proportion of the profits is kept for reinvestment.

The new Common Agricultural Policy for the years 2014-2020 extended the range of authority for the individual countries, making it possible to focus on more customised solutions to enhance competitiveness.

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