

## CAPITAL CONCENTRATION VERSUS FINANCIAL EFFICIENCY OF FAMILY FARMS

### Summary

*The paper presents research findings concerning financial efficiency in the context of capital concentration in the economy. The research was based on farm data collecting information on accounting for 2004-2011. The research shows that returns, obtained by farms more intensively gathering capital, are below the weighted average cost of capital.*

**Key words:** capital concentration, financial efficiency, family farm, equity, weighted average cost of capital, quartile, return, cost of capital

### Introduction

The industrial concept of development is one of the world trends in agriculture and agri-food sector. This direction of agriculture and agri-food sector development forces concentration of capital and arable land, as a result of globalisation and increasingly stronger competition. According to the national trends, integration and globalisation processes are inevitable in the Polish economy and their strength will build up in the future. The Polish farmers should engage in more intensive actions to survive periods of changing and often adverse business cycles and tougher competition, linked to inflow of agricultural products from abroad. These phenomena have an impact on fluctuations in cost-effectiveness of production; thus, farmers need to introduce not only new products but also a modern, more effective methods of their manufacture, which is linked, e.g., to capital concentration. The concentration processes in family farming consist, above all, in equity accumulation, which, however, raises doubts whether or not they actually contribute to better cost-effectiveness and profitability of agricultural holdings. The paper aims at determining how the processes of capital concentration on family farms influenced a change in financial efficiency calculated

using measures based on financial surplus compared to the cost of capital. The thesis of the paper is that faster capital concentration has a positive impact on the achieved results and financial efficiency of a family farm.

### **Concentration, capital, financial efficiency – literature review**

Capital concentration is defined as a process of increasing economic strength of an enterprise by means of development of joint-stock companies or mergers (Słownik... 2014). The economy shows two attitudes to the phenomenon of concentration. One is seen as concentration of production, the other as concentration of the market. The latter is focused, mainly, on growth in the share of products of a given enterprise or group thereof in the market. Whereas the concentration of production aims at better competitive ability of an enterprise, primarily, through growth in production or taking over of other links in the production process. The traditional neoclassical paradigm clearly identifies capital concentration with market domination and restriction of competition. To be recognised as efficient, competition has to lead, in the long term, to the highest possible allocative efficiency, productive efficiency and benefits to consumers (distributive efficiency). Capital concentration can foster, but it does not guarantee, creation of new technologies. In practice, it is most often arrived at by mergers and takeovers (both concentration of production and of the market), strategic alliances and enterprise networks (concentration of the market) (Czerwonka L. 2014). Capital concentration is an element of a natural process of rational business management. It is not a dangerous or irreversible trend, but a result of the talent of managers and their ability to effectively manage a business unit. Therefore, farmers in the current situation of large area fragmentation can significantly influence the improvement of their economic and competitive position by increasing the acreage of their farms (Karwat-Woźniak B. 2009) and raising the value of equity.

T. Tomczak (2004), analysing the role of agriculture, indicates that economic progress results, e.g., in declining importance of agricultural activity in the economy, which is reflected by continually dropping share of agriculture in the generation of the Gross Domestic Product. This trend is a universal regularity dictated by economic development processes but “contraction” of agriculture does not automatically mean its marginalisation (Woś A. 1999). The decreasing number of family farms points, at the same time, to processes of concentration of land and, probably, also capital.

It should be kept in mind that efficient functioning of agricultural holdings and enterprises requires its owners (users) to have a relevant acreage of land and technological potential enabling to achieve a high productivity and efficiency of farming at, undoubtedly, high production expenditure. It is also important to show capital ability to boost growth. At present, it is difficult for farmers to meet these conditions, mainly, because there is no free arable land acreage and

because of the capital barrier. It should be also added that the process of substitution of the factors of agricultural production intensifies; thus, replacing land with labour and capital inputs, especially the latter, is increasingly more important (Johnson D.G. 2002).

Hence a question arises: what is this capital?

Capital is viewed as an abstract category, which is identified with economic ability to perform work, subject to the principle of capital preservation and free capital distribution (Teoria... 2010). M. Kawa (2002) also notes the abstractedness of capital, indicating that there is a difference between assets and capital. The latter has the ability to make profits forming the abstract own and borrowed earning assets (Kurek B. 2010). It should be noted that lack of one definition of capital in the economy, finances and accounting makes its essence dependent on the researcher's approach, i.e., it can be viewed differently from micro- and macroeconomic perspective. Regardless of the above, capital constitutes an abstract ability to perform work (Dobija M. 2007). The basic significance of the capital for the economic sciences stems from the fact that each being has the opportunity to exist and survive, as long as it knows how to save and multiply seed money, while activity resulting in loss of capital is a path leading to non-existence. What is more, capital cannot be created it has to be received, earned and one has to get remuneration for having it. It is transferred to and gathered in given assets through work. However, capital undergoes a natural diffusion, e.g., through inflation reducing the value of money.

If the capital is the fundament of earnings, it is necessary to determine the level of effects that it can produce. This measurement is conducted at various levels, making it possible to separate technical, economic and social efficiency. The assessment in agriculture is strongly influenced by the agrarian structure, which affects the ability to generate economic surplus necessary to ensure satisfactory income for the rural population and investments for an agricultural holding. But a question comes up: how to measure this efficiency from the perspective of finances of a farmer and his family? Recently, there emerged a concept of assessing farming with the use of financial efficiency. According to J. Kulawik (2008), most of the authors, primarily those professing the traditional financial analysis, understand financial efficiency simply as various types of profitability. Undoubtedly, profitability indices are very popular measures of efficiency, especially given the simplicity of their structure and interpretation. However, according to J. Kulawik equating profitability with economic efficiency is not justified on the grounds of the newest trends in the science on the finances of an enterprise. This refers, above all, to the concept of value based management or managing by values, presented for the first time in the mid-1980s. This concept is invariably based on the assumption that a modern enterprise strives, above all, at value maximisation. However, in the case of a family farm, value for a farmer will be something completely different than what was assumed by the

aforementioned concept, but the farmer should be also interested in achieving as high as possible value (benefit) on capital invested on a farm. The proposal by E.A. Helfert provides an interesting take on the modern understanding of financial efficiency. The author writes that the fundamental economic purpose of sound management is “(...) deployment of selected resources in order to create, over time, economic value sufficient to recover all of the resources employed while earning an acceptable return on these resources under conditions that match the owners’ expectations of risk.”<sup>1</sup>

Nowadays, it is vital to determine the total cost of capital, i.e. both borrowed and equity, involved in the system of financial efficiency measurement (Kulawik J. 2008). This measurement system prefers measures and indices based on cash flows, which are also characterised by certain weaknesses, because it is difficult to create a holistic measurement system for performance and financial efficiency of enterprises which would reflect the diversity, multitude and complexity of mechanisms of its formation and value generation. The vast majority of presently applied tools are used only to measure short-term performance, but it fails to provide a possibility to explain the phenomenon of value generation in a long term perspective.

It should be also noted that improvement of efficiency and competitiveness of companies and increase in their value after implementation of the given concept of measurement thereof, does not necessarily mean that this very concept caused the positive changes (Pomykalska B., Pomykalski P. 2007; Dudycz T. 2005).

It needs to be mentioned that the measures and indices, based on the financial surplus, are one of the many options of assessing the effects – which are a consequence of progressing globalisation processes – in their dynamic aspect and this is not, after all, without significance in the changing environment.

### Research methodology

The research covered 5,350 family farms collecting the FADN accounting data on a continuous basis between 2004 and 2011. The research was based on a uniform group (balanced panel) of farms, because it was deemed that only thus it is possible to assess changes in capital increase. Farms, which have increased equity in the researched period, were selected from the group. The preliminary data analysis showed that changes in the value of equity in the next years proceeded at different rate, thereby the classification of farms was done in stages. In the first place, the value of a farm’s capital was corrected by the value of land. This allowed to eliminate the impact of a change in land pricing method<sup>2</sup> on the growth in the value of capital. Next, to check the changes in value of the “cleared” equity ( $K_w$ ), the following formula was used (1):

<sup>1</sup> E.A. Helfert: Techniques of Financial Analysis: A Practical Guide to Measuring Business Performance. 9<sup>th</sup> Edition [translator’s footnote].

<sup>2</sup> In 2004-2008, land was priced by estimated conversion rate, while since 2009 market prices have been applied.

$$Kw_{t_n} - Kw_{t_0} > 0 \quad (1)$$

where:

$t_n$  – value of equity in year  $t$ ,

$t_0$  – value of equity in reference year.

There were 3,568 farms meeting the inequality assumptions (1), which accounted for 67% of all repeated entities in the 2004-2011 period. The study used quartile method. Two groups of farms were selected. The first group covered farms which were in the lower quartile, i.e. farms characterised by minor changes in the value of equity. The second group included farms which witnessed the highest growth in the value of equity in the researched period (upper quartile). The method applied did not affect the number of input and output farms, which means that the same family farms were in both groups.

Financial efficiency was defined as the ability of a farm to generate financial surplus on assets, equity and work, measured by rates of return as per the equations (2, 3, 4), taking into account the cost of capital.

$$CFROA = \frac{DGR + A}{E + D} \quad (2)$$

$$CFROE = \frac{DGR + A}{E} \quad (3)$$

$$CFRFW = \frac{DGR + A}{AWU} \quad (4)$$

where:

$CFROA$  – cash flow return on assets,

$CFROE$  – cash flow return on equity,

$CFRFW$  – cash flow return for work,

$DGR$  – farm income,

$A$  – amortisation,

$E$  – equity,

$D$  – debt,

$AWU$  – farm labour input (in conversion units).

The weighted average cost of capital ( $WACC$ ) was calculated based on the formula (5) to compare  $CFROA$  with  $CFROE$ , whereas to compare it with the  $CFRFW$  the cost of capital ( $CC$ ) formula (6) was suggest.

$$WACC = u_E \cdot r_E + u_D \cdot r_D \quad (5)$$

$$CC = r_E \cdot E + interest \quad (6)$$

where:

$u_E$  – share of equity in the structure of capital,

$u_D$  – share of debt in the structure of capital,

$r$  – interest rate,

other symbols as is (2), (3) and (4).

The cost of equity was calculated based on interest rate on long-term treasury bills<sup>3</sup>, which was at the level of 6.5-7.5% (the middle value, i.e. 7%, was used for calculations) in 2004 and 4.47% in 2011.

Additionally, the paper uses descriptive statistics and comparative analysis.

### Characteristics of researched farms

Table 1 compiles information on provision of basic factors of production to the researched groups of farms and economic results obtained by them in 2004 and 2011.

Based on data in Table 1, it was concluded that the analysed groups were characterised by land and capital concentration processes. The phenomenon took place on decidedly greater scale at farms from the upper quartile. The greatest differences concerned changes in the utilised agricultural area and capital in total. Farms, which were characterised by smaller “input” (lower quartile) utilised agricultural area (UAA) noted a growth by only 2 ha, i.e. 10% (lower quartile), while farms from the upper quartile noted growth at the level of ca. 15 ha, i.e. 30%. This means that farms having greater “input” area increased the resources faster. Provision of land translated into the amount of and change in the capital because UAA decides on the provision of farms with capital. There was a significant difference in the value of capital in the researched groups. Farms from the upper quartile had capital worth ca. PLN 772 thousand, i.e. almost 3 times higher than farms from the lower quartile. In the analysed period larger farms doubled their capital, while in 2011 farms from the lower quartile accumulated 11% of capital more than in 2004. However, regardless of the diagnosed differences farms were characterised by dominance of equity in the sources of financing. The research revealed a relatively small share of debt in financing of farms. It amounted to 8% and 10% for farms from the lower quartile and 20% and 16% from the upper quartile, respectively, in 2004 and 2011. The decreasing share of borrowed capital indicates faster growth in equity for units of greater potential. Then, smaller farms started to experience capital shortages and run up debts, which was linked to implementation of financial investments under the Rural Development Programme (RDP).

<sup>3</sup> Mańko and Goraj (2011) indicated that the cost of equity can include interest rate on long-term bank deposit.

Table 1

**Basic information on groups of farms**

Specification	Lower quartile		Upper quartile	
	2004	2011	2004	2011
Land (ha of UAA)	20.40	22.40	58.50	73.00
Capital excluding land (PLN)	262,650.00	291,064.00	772,434.00	1,498,342.00
Work (AWU)	1.80	1.78	2.60	3.00
Farm income (PLN)	25,793.00	56,810.00	102,723.00	257,060.00
Long-term loans (PLN)	15,817.00	25,377.00	127,789.00	181,153.00
Short-term debt (PLN)	8,100.00	7,950.00	47,063.00	62,642.00

Source: own calculations based on the FADN PL.

The number of full-time workforce units (AWU) at farms having smaller labour capacity was lower – at the level of ca. 1.8 unit. Higher labour capacity was noted at larger farms that in the researched period increased by 0.4 unit, which means a growth by ca. 880 hours in the researched period.

Analysis the value of farm income showed that it doubled its value and farmers from the upper quartile had slightly higher growth rate, which amounted to 151% (lower quartile – 122%). These changes resulted from a growing support on account of direct subsidies, but this was a good period for agriculture. The observed dynamics does not determine the growth in equity, given that the income does not constitute retained earnings of an agricultural holding but goes to a family (household) and, depending on the needs of the family, it is distributed to accumulation and consumption. This was indicated by actions taken in the field of real investments.

**Research results**

Table 2 compiles figures showing the level of returns on assets, equity and for work.

Table 2

**Cash flow returns on assets, equity and for work unit**

Specification	Lower quartile		Upper quartile	
	2004	2011	2004	2011
CFROA (%)	15	10	19	1
CFROE (%)	17	30	26	3
CFRFW (PLN)	21,739.00	41,597.00	55,889.00	130,966.00

Source: own calculations based on the FADN PL.

Returns on assets in 2004 were definitely higher than in 2011, in both of the analysed groups, while lower – by only 4 percentage points (pp) – profitability indices were noted for farms of lower value of capital in the reference year. This justified the statement that in 2004 farmers used assets to generate financial surplus with similar intensity. The situation was quite different in 2011, when definitely lower returns on assets were noted. This referred, mainly, to farmers having at their disposal greater land and capital resources (difference of 18 pp against the reference year). Deterioration of the financial situation concerned also farms from the lower quartile (profitability index decreased by 5 pp). It should be concluded that capital concentration in this case brought positive effects.

Whereas return on equity showed a higher level as compared to *CFROA*, which was a consequence of using external sources of financing by the farmers. In 2004, there was a clear difference in the level of *CFROE* between quartiles – 9 pp to the advantage of farms of higher resources. In 2011, the situation changed and it was more beneficial for farms from the lower quartile. Farmers generated PLN 0.30 of income from each PLN 1.00 of equity, i.e. in the period of 8 years there was a growth by 13 pp. At that time, farms from the upper quartile noted a drop in the level of *CFROE* by 23 pp to 3%. These figures point to a higher efficiency of farms from the lower quartile, whose intensity of concentration of equity is lower but, at the same time, they get higher surplus on each unit of equity. The results show rational behaviour of farmers having at their disposal lower resources, also in the area of incurring debts, which brings a positive effect in the form of financial leverage. Farmers from upper quartile farms increased equity in a definitely more dynamic manner, but changes within the scope failed to bring a proportional growth in income obtained from an agricultural holding and also financial surplus. This behaviour points to excessive investments, which were not used to a degree enabling to achieve suitably high benefits. The observed situation gives reasons to state that the abilities of farms to achieve higher financial effects depends also on the possibilities to enhance productivity of biological assets.

However, also other aspects have to be considered in the assessment. For instance, maybe farmers did not intend to achieve the highest possible rate of return but they wanted to simplify and facilitate the work of a family and, consequently, to improve performance. Considering efficiency, also in terms of those working at a farm (family members, seasonal workers), it needs to be concluded that there are considerable differences between respective groups. In 2004, depending on the quartile, ca. PLN 21 thousand (lower quartile) and ca. PLN 56 thousand (upper quartile) was economised per each unit employed at a farm. Thus, farms of greater potential created conditions to economise surplus of more than 2 times higher value per AWU. In subsequent years, these disparities deepened and each person working at a farm economised over PLN 130 thousand, which is over 3 times more than the amount of surplus per one

person employed at a farm of lower level of resources and potential. It needs to be stated that although return on involved capital for farms from the upper quartile was at a very low level, the investments made enabled to improve labour productivity.

To complement the account of financial efficiency, Table 3 compiles figures concerning the cost of borrowed capital, weighted average cost of capital (WACC) and *CC* in the researched groups.

Table 3

**Interest rate and amount of interest on borrowed capital and weighted average cost of capital in the researched groups of farms**

Specification	Lower quartile		Upper quartile	
	2004	2011	2004	2011
Interest (PLN)	688.00	4,473.00	1,017.00	8,073.00
Interest rate (%)	4.60	4.00	3.50	4.50
Share of borrowed capital (%)	7.60	7.00	20.00	16.00
WACC (%)	6.88	4.44	6.30	4.47
CFROA – WACC (%)	+8.12	+5.56	+12.70	-3.47
CFROE – WACC (%)	+10.12	+25.56	+19.70	-1.47
CFRFW – CC (PLN)	+4,136.00	+25,414.00	+11,616.00	+66,633.00

Source: own calculations based on the FADN PL.

Average cost of interest incurred by farmers was at a relatively low level, within the range of 1-2% (lower quartile) and 3-4% (upper quartile) of income. For farms of lower potential its value increased by 6.5 times and in the compared group – 7.5 times. This resulted from increased value of debt, although not to such a high degree in the researched groups, which points to a change in the conditions of extending loans to farmers. It needs to be concluded that for owners (users) of farms accumulating equity the interest rate dropped to a smaller extent (by 0.60 pp in 2011), which may indicate that these farmers were granted loans on preferential terms. Farms from the upper quartile note lower interest in the first of the analysed years and its growth in 2011. This shows that farmers (apart from loans bearing lower interest rate) used also loans bearing interest according to commercial rules. Figures in Table 3 indicate that family farms use external sources of financing to a slight degree. This is confirmed, apart from minor financial costs, by an insignificant (lower quartile) share of borrowed capital in the sources of financing. Indeed, farmers from farms with slightly greater potential topped equity shortages up to a somewhat greater extent, but in the researched period this share was limited to 16% (drop by 4 pp against 2004).

This relationship was caused by faster growth rate of the value of equity to borrowed capital, moreover, farmers could deem that higher debt may distort the sense of security of a family.

The fact that family farms mostly used equity for financing decided on the weighted average cost of capital. The *WACC* showed similar values in subsequent years for researched groups. In 2004, the *WACC* was at a higher level but as a result of decreasing interest rate on long-term deposits (alternative use of equity) it was also lowered to ca. 4.5%. In 2011, such a low return on a farm proved to be problematic for farms of higher resources. Both *CFROA* and *CFROE* were at a lower level which can point to poor financial efficiency of these farms. It should be noted that in 2004 these farms showed high efficiency even at higher *WACC*. The situation of farms from the lower quartile was quite different, as in 2011 they noted positive financial efficiency. This can be evidenced by the fact that excessive capital concentration at farms leads to reduced efficiency. It is interesting that in the researched groups in all of the analysed years farmers reached a higher financial surplus as compared to the costs of capital, which needs to be considered as a justification for engaging this factor in agricultural activity. However, it needs to be stated that although farmers from the upper quartile reached higher return on work unit, the changes were slower.

### **Conclusions**

This research enabled to formulate the following final conclusions:

1. Family farms increase their capital to a different degree and enlargement of the area of a farm is a factor speeding up this process.
2. Output production potential decides on the capital concentration; farms of greater potential increased their assets faster and achieved better economic results.
3. Returns on capital and equity for farms from the upper quartile had clearly lower values than for farms from the lower quartile. However, farms of greater capital concentration achieved better results per one employed person.
4. The weighted average cost of capital was determined by the cost of equity, which dominated in financing of farms. But it was farms of slower capital concentration that economised returns on a higher level than the *WACC*.
5. The thesis of the paper was not justified, which shows that too fast capital concentration processes in agriculture (especially family farming) fail to bring positive financial results.

**Literature:**

1. Czerwonka L., Panaku E.: Koncentracja kapitału i jej implikacje dla współczesnej gospodarki światowej, [www.ae.krakow.pl/~ekte/konf/czerwo.doc](http://www.ae.krakow.pl/~ekte/konf/czerwo.doc), access: 20.10.2014.
2. Teoria pomiaru kapitału i zysku (ed. M. Dobija). Wyd. Uniwersytetu Ekonomicznego w Katowicach, 2010.
3. Dobija M.: Abstract nature of capital and money [in:] *New Developments in Banking and Finance* (ed. L.M. Cornwall). Nova Science Publisher, Inc., New York, 2007, 89-114.
4. Dudycz T.: Zarządzanie wartością przedsiębiorstwa. Polskie Wydawnictwo Ekonomiczne, Warszawa 2005.
5. Goraj L., Mańko S.: Model szacowania pełnych kosztów działalności gospodarstw rolnych, *Zagadnienia Ekonomiki Rolnej*, no. 3(328), 2011, 28-58.
6. Harasim A.: Przewodnik ekonomiczno-rolniczy w zarysie. IUNiG-PIB, Puławy 2006.
7. Helfert A.E.: Techniki analizy finansowej. Polskie Wydawnictwo Ekonomiczne, Warszawa 2004.
8. Johnson D.G.: The declining importance of natural resources: lessons from agricultural land. *Res. Energy Econ.* 24, 2002, 157-169.
9. Karwat-Woźniak B.: Gospodarstwa wysokotowarowe w rolnictwie chłopskim. Synteza wyników badań 2005-2009. Program Wieloletni 2005-2010, no. 151, IERiGŻ-PIB, Warszawa 2009.
10. Kawa M.: Ewolucja pojęcia majątku jednostek gospodarczych. *Zeszyty Teoretyczne Rachunkowości. Stowarzyszenie Księgowych w Polsce, Rada Naukowa w Warszawie*, 2002.
11. Kulawik J.: Analiza efektywności ekonomicznej i finansowej przedsiębiorstw rolnych powstałych na bazie WRSP, IERiGŻ-PIB, Warszawa 2008.
12. Kurek B.: Kapitał jako ekonomiczna zdolność do wykonywania pracy. *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie* 829, 2010.
13. Pomykalska B., Pomykalski P.: Analiza finansowa przedsiębiorstwa. Wyd. Naukowe PWN, Warszawa 2007.
14. Słownik Języka Polskiego. Strona internetowa, [sjp.pwn.pl](http://sjp.pwn.pl), access: 3.11.2014.
15. Tomczak T.: Od rolnictwa do agrobiznesu. Transformacja gospodarki rolniczo-żywnościowej Stanów Zjednoczonych Ameryki Północnej. SGH, Warszawa 2004.
16. Wiktorowski K.: Rolnictwo ekologiczne a koncentracja kapitału w sektorze rolno-spożywczym. *Folia Pomeranae Universitatis Technologiae Stetinensis Folia Pomer. Univ. Technol. Stetin.* 2012, *Oeconomica* 292 (66), 115-128.
17. Woś A.: Konkurencyjność wewnętrzna rolnictwa. IERiGŻ, Warszawa 1999.
18. Zegar J.S.: Struktura polskiego rolnictwa rodzinnego pod koniec pierwszej dekady XXI wieku. IERiGŻ-PIB, Warszawa 2009.

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## KONCENTRACJA KAPITAŁU A EFEKTYWNOŚĆ FINANSOWA GOSPODARSTW RODZINNYCH

### Abstrakt

*W artykule przedstawiono wyniki badań dotyczące efektywności finansowej w kontekście koncentracji kapitału w gospodarstwie. Podstawę stanowiły dane gospodarstw gromadzących informacje rachunkowe w okresie 2004-2011. Z badań wynika, że gospodarstwa intensywniej gromadzące kapitał osiągają stopy zwrotu poniżej średnioważonego kosztu kapitału.*

**Słowa kluczowe:** koncentracja kapitału, efektywność finansowa, gospodarstwo rodzinne, kapitał własny, średnioważony koszt kapitału, kwartył, stopa zwrotu, koszt kapitału

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