CASH FLOWS IN THE OPTIMIZATION OF CAPITAL STRUCTURE IN AGRICULTURAL HOLDINGS WITH ANIMAL PRODUCTION

Magdalena Mądra-Sawicka

Warsaw University of Life Sciences, Faculty of Economic Sciences

Abstract

This study presents the results of a non-linear optimization of available sources of financing of agricultural holdings with animal production, which was carried out based on data obtained from the FADN-PL database for the year 2008. On the basis of the model, a capital structure was designed for the "granivores" type of holdings, which were characterised by either a low or a high debt level. On the basis of the research conducted it was observed that the optimization of sources of financing enables the operational balance and the income to increase for those family-owned agricultural holdings which maintained high levels of debt. The optimum cost of capital determined for a given available financing structure, coupled with implementation of a given investment project, contributed to an improvement of ROE in holdings employing a higher level of borrowed capital.

Keywords: farms, optimization of capital structure, cash flows, animal production

1. Introduction

The financing structure of economic entities is one of the factors which influence the current financial results, as well as the profitability of development projects which are carried out at any given time. The policy adopted by the managers in respect of capital structure design requires finding a compromise between the level of risk and such a rate of return that would ensure an optimum debt-equity ratio. In the nineteen fifties these issues were the focus of Miller's and Modigliani's research. According to capital structure theory, it is impossible to determine precisely the optimum proportions of different sources of financing. The aspects that may be identified include the scope of optimization, on the basis of which other factors are established which constitute key areas enhancing the effectiveness of the enterprises' operations. Managers of companies should select their sources of financing in such a way as to take advantage of the financial leverage effect, thus decreasing the weighted average cost of capital. One must therefore determine what the costs of particular capital components are, in what way the proportions between them change and at what point the optimum structure has been achieved.

Designing the capital structure in a dynamic way requires an approach which is focused on managing by values; small economic entities, on the other hand, make decisions based on reference to the maximization of income. In addition, managers of small entities try to use their own income by retaining it within the company and by financing their operations with this source of capital for as long as possible, thus, in the end, increasing the level of debt (Michaelas, Chittenden, Poutziouris, 1999, p. 127). This issue is related to contemporary economic theories, as well as to the behavioural and managerial concepts, the concept of ownership rights (the law of property), agency and transactional (transactions) costs and the systemic approach (Tokarski 2007, p. 15). The reason for this situation is the willingness to achieve a set of targets which will be linked to the maximization of profit, as well as satisfying other needs, e.g. social needs.

The difference between small and medium enterprises as opposed to big entities stems mainly from more restricted possibilities for growth, in relation to the trade-off theory of capital structure (Lopez-Gracia, Sogorb-Mira, 2008, p. 131). The optimization of capital structure in an enterprise should, therefore, be focused on increasing the rate of return on equity (ROE). This ratio enables the specialists to assess possibilities for growth. According to the sustainable growth model, the rate of growth of an enterprise depends on the financial effectiveness of equity (own capital) and on the dividend payout yield (Kowalczyk, Kusak 2006, p. 274). A higher level of the return on equity ratio will translate into a higher safe growth rate, which in the long term leads to a decrease in the level of borrowed capital in the financing structure. A low ROE ratio may motivate to seek external sources of financing. According to the research results of Behr and Guttler, conducted in the SME sector in Germany, a ROE ratio which does not exceed 20% may be a decisive factor motivating to seek external sources of financing (2007, p. 195). The authors have proved that increasing the level of ROE and ROS (return on sales) contributes to an improvement in the financial stability of SMEs and reduces the risk of defaulting on obligations (default risk) (Behr, Guttler 2007, p. 202).

Making use of equity in agricultural holdings often leads to its permanent tying-up and translates into accepting a low level of profitability. It is connected mainly with the pecking order theory, according to which farmers prefer, above all, to self-finance their activities (conducted performance) (Mądra 2008, s. 564-566). This approach may restrict the possibilities linked to the advantages of the financial leverage effect.

Designing the capital structure is connected with cash management through appropriate regulation of expense and receipt flows. Maintaining this equilibrium creates favourable conditions for the improvement of financial liquidity (Śnieżek 2008, p. 88). One of the detailed variations of the Markov's model determines the optimum capital structure by defining the objective function in the optimization operations as a sum of discounted clean profits (after tax) and the quantiles of the sum of discounted clean profits (after tax) in a situation when an enterprise does not pay out dividends (Kowal 2009, p. 23). An optimization in reference to planned cash flows which is conducted in this way enables us to assess the influence of alternative solutions on financial results, also when allowing for short periods. The managers' orientation towards generating a positive cash surplus in every period minimizes the risk of financial gaps for conducting business activity (Maślanka 2008, p. 28). Future cash flows also determine the value of an economic entity, hence in their current and future assessment the cost of capital, as well as risk should be taken into consideration (Michalski 2005, p. 23).

2. Research methodology

The purpose of the study is to demonstrate the links between the results obtained from an optimised capital structure and the debt level in particular agricultural holdings with animal production. Among the assumptions for optimisation the following factors have been taken into account: the seasonal character and the specificity of agricultural production, and thus the dynamic design of the capital structure through the use of cash flows for optimisation purposes.

The estimated non-linear optimisation model covers quarterly periods, while taking into consideration the dynamic interrelations in the capital structure between the inflows and outflows from the financial activity on the one hand, and the changes in expenses and the time of obtaining cash flows from operating activity on the other. The objects of study included individual agricul-

19th International Farm Management Congress,
IFMA19 Theme: SGGW, Warsaw, Poland   Risk & Sustain

CASH FLOWS IN THE OPTIMIZATION OF CAPITAL STRUCTURE IN AGRICULTURAL HOLDINGS...

tural holdings which provide access to data within the Farm Accountancy Data Network (FADN) system[1], which, in turn, are collected by the Institute of Agricultural and Food Economics - the National Research Institute. The FADN field of observation covers commercial holdings, which significantly contribute to creating added value in agriculture[2].

The estimation in the optimization model has been conducted for the year 2008 with regard to holdings characterised by unidirectional production typical of the "granivores" type of farming. For the purposes of the optimization model, the most frequently used and the most easily available sources of external financing were analyzed, such as: long- and short-term subsidized loans and short-term commercial loans. The purpose of constructing the model was to find such a structure of external sources of financing in relation to the level of equity in agricultural holdings as to obtain the maximisation of income in family-owned agricultural holdings. The achievement of this goal was based on the following premises: maintaining financial liquidity, increasing the profitability of the conducted activity, as well as obtaining a higher rate of return on equity (while taking into consideration the adopted financing strategy).

In the optimization model in the quarterly perspective the balance value of cash generated from operating activity was maximised, while allowing for the operating costs and expenses for contracted loans. It enabled an analysis of short-term financial decisions which could be made by farmers in a situation in which higher levels of both short- and long-term indebtedness are employed in agricultural production.

The holdings in the population studied were divided according to the value of the overall debt ratio, which is calculated as a ratio of liabilities to total assets. Four groups were distinguished:
• holdings without liabilities,
• the first quartile constituting 25% of holdings with the lowest indebtedness levels,
• the doubled quartile including 50% of holdings with an average indebtedness level, and
• the last quartile covering 25% of holdings with the highest levels of indebtedness.

For the purposes of the optimization model the following were chosen: the holdings from the first quartile constituting 25% of all holdings with the lowest indebtedness levels ("low debt group") and the fourth quartile - covering 25% of holdings with the highest levels of indebtedness. The selection of these two groups was based on the consideration of differences in the existing capital structures in these holdings. In addition, applying the above selection criteria enabled the researcher to determine the effect of employing external sources of financing, provided the investment projects are carried out and the capital structure is optimized, in holdings with different strategies in the area of financing their activity.

The selection of "standard" holdings was intentional and consisted in choosing the most typical representatives of the general population and selecting entities with average characteristics[3].

---

[1]   The FADN system in Poland collects data for agricultural holdings whose economic power is higher or equal to 2 ESU (Economic Size Unit). The selection of a sample of agricultural holdings in the FADN database is statistically representative in a given region, based on the reference to the area of cropland and the economic power (ESU) of that region. For the purposes of this study the Mazowsze (Mazovia) and Podlasie (Podlachia) regions have been selected, as there are middle-sized agricultural holdings with an average production intensity levels (according to data from FADN) located in those regions.

[2]   Standard Gross Margin (SGM) is a surplus of production levels in a given agricultural activity over the level of direct costs in production conditions which represent the average conditions in a given region.

[3]   In compliance with the dissemination principles of FADN data, the results presented cover a "standard farm" for a group of at least 15 holdings.

The process of selection of typical entities was carried out with regard to holdings through the application of the Euclidean distance[4].

Optimization restrictions were selected on the basis of balance characteristics, correlation and regression analysis, the estimated borrowing costs for particular components of capital together with their due dates were established on the basis of cooperation with a selected cooperative bank as well as on the basis of data obtained from a commercial bank. The following were considered to be the restricting conditions in models of capital structure optimisation:

1. $B_C > 0$ – balance value of cash greater than zero

The level of cash in agricultural holdings, both at the beginning and at the end of each quarter is greater than zero.

2. $$\sum_i I_{STC} \geq \sum_i O_{STC}$$

where:

I_{STC} – sum of short-term credit inflows, both subsidized loans, as well as commercial loans in the ith quarter, O_{STC} – sum of short-term credit outflows, both subsidized , as well as commercial in the ith quarter.

The short-term loans of holdings may, but need not, be repaid in total in a given business year. This results from the possibility of servicing the debt in typical holdings in a given period simultaneously with carrying out the planned investment projects and in a shortfall in sources of financing. Outstanding short-term loans will contribute to the increase of the share of short-term liabilities of those holdings to the end of the year. The cash flow balance from financial activity is greater than zero in a given year because of the fact that holdings use the subsidized long-term loans for investment purposes. Interest cost was allowed for as a variable which directly influences the balance from operating activity, thus shaping the financial results of agricultural holdings.

3. $$\sum_i I_{STC} \leq A$$

where: A – average value of current assets to the beginning and to the end of the year.

In the holdings with the lowest levels of indebtedness the possibility to employ short-term borrowing was restricted by the average value of current assets in a given quarter. This reflects a more conservative approach to the strategies of financing on the part of the managers in these holdings. In the case of holdings with higher levels of debt, on the other hand, the possibility to increase the level of employment of short-term borrowings may be demonstrated as follows:

$$\sum_i I_{STC} \leq 1{,}5 * A$$

---

[4] The average value obtained from actual data was used in the constructed optimization models. Standardization of characteristics was assumed in order to apply the value of the measurement units used to choosing a typical entity and to ensure their comparability. Measures of the similarity of entities were established on the basis of distances which constitute nonnegative values and which equal zero for the ith entity whose distance is the same as to the jth entity (researched population constituted almost 4500 farms). These assumptions enabled the creation of a multidimensional metric space in which an increase in the distance from the pattern signifies an increase of distance, whereas a value closer to zero means that an entity is more similar to the pattern (the typical entity).

19th International Farm Management Congress,
SGGW, Warsaw, Poland

IFMA19 Theme: Risk & Sustain

CASH FLOWS IN THE OPTIMIZATION OF CAPITAL STRUCTURE IN AGRICULTURAL HOLDINGS...

This assumption results from the fact that managers in this type of holdings adopted a more aggressive strategy of financing the activity and accepting a higher level of risk connected with the possibility to contract short-term liabilities whose value exceeds 150% of the value of current assets. This reflects the possibility to periodically finance the fixed assets with short-term loans in situations of an increased demand for external sources of financing. Determining the top limit (cap) for the sum of financial inflows from short-term loans used for conducting activity made it possible to establish the maximum operation risk in agricultural holdings and to repay current liabilities.

4. $$3 * \sum_i I_{STCL} \leq \sum_i I_{STSL}$$

where: I_{STCL} – financial inflows from short-term commercial loans in the ith quarter,
I_{STSL} – financial inflows from short-term subsidized loans in the ith quarter,

The model restrictions were complemented by a condition which allows for the diversification of the capital structure; this was done by differentiating between the subsidized and commercial short-term sources of financing in a proportion of 3 to 1, (75 to 25%), which characterized the holdings with the highest levels of indebtedness. It results from limitation to raising capital from a cooperative bank and from a possibility to finance the activity with commercial loans.

5. $ROE > C$

where: ROE – return on equity (%),
C – cost of raising borrowed capital.

In the case of this restriction it is assumed that the return on equity rate should be higher than the cost of employing external capital, which is connected with an increase in financial costs and debt service. This assumption makes it possible to shape the employed borrowed capital which in such a way that it will contribute to the maximization of income from a family-owned agricultural holding and the maximization of the cash balance from operating activity in given management conditions.

6.   Repaying the interest on loans

The outflows for interest on short-term loans have been calculated depending on their due date. In the case of loans extended for a period of 180 days - 66% of the value of interest is repaid in the first quarter, while the remaining 36% of this value - in the second quarter together with the repayment of the loan. Whereas in the case of loans with a due date after the lapse of 270 days: 50% of the value of interest is repaid in the first quarter, when the loan was contracted, while the remaining 33% of this value - in the second quarter and 17% - in the third quarter.

7.   The minimum value of a short-term loan

$$\sum_i I_{STC} \geq \min value$$

This restriction results from setting a minimum value of short-term loans, both subsidized, as well as commercial.

On the basis of a given limit for raising short-term capital, the schedule for the repayment of interest and the borrowed sum, the formula of an exponential function has been estimated. This function makes it possible to encumber each given sum (e.g. 1 PLN) with a gradually higher interest rate, which increases proportionally to the value of short-term loans (table 1). The formula

Table 1. Exponential function of the employment of short-term sources of financing in the optimization model

Sources of financing	$x_{STSL(t=180)}$	$x_{STSL(t=270)}$	$x_{STCL(t=180)}$	$x_{STCL(t=270)}$
F(x)	$(x^{0,00286} - 1)x$	$(x^{0,00506} - 1)x$	$(x^{0,00450} - 1)x$	$(x^{0,00706} - 1)x$

STSL – short-term subsidized loans, *STCL* – short-term commercial loans, *t* – period
Source: own elaboration

of this function has been estimated particularly for every external short-term source of financing. It was thus possible to shape the debt level while allowing for the cost of raising capital from a selected source of financing. This function enables an estimation of risk which results from problems in repayment of higher levels of interest on loans from the current financial surplus in a given holding in a given quarter.

3. Research results

The capital structure optimization of agricultural holdings of the "granivores" type of farming allowed the carrying out of investment projects together with employing long-term subsidized loans. The demand for capital has been estimated on the basis of the possibility to obtain subsidized loans in cooperation with a cooperative bank. It was assumed that an investment project was carried out in the holdings which required the employment of long-term subsidized loan and which consisted in an adaptation of an empty building for a pigsty. The average cost of purchasing machinery and equipment, renovating and adapting an empty building for the purpose of pig breeding has been estimated. On this basis the demand for long-term capital has been calculated allowing for the possibility to obtain a subsidized loan in cooperation with a cooperative bank. In addition to employing long-term sources of financing, the necessity to make use of short-term working capital facilities in view of shortfall in cash for purchasing livestock in the 1st and 3rd quarter of the business year.

The decision variables which were assumed in the optimization model for the holding with the "granivores" type of farming included a short-term subsidized loan contracted in the *i*th quarter for the period of 180 days and a short-term commercial loan contracted in the *i*th quarter for the period of 180 days. This resulted from adapting an assumption about an open six-month pig production cycle in those holdings. The demand for capital was lower in the 2nd and 4th quarter due to higher inflows from operating activity (sale of pigs).

The effect of employing the borrowed capital in the form of operating inflows in the holdings of the "debt" and "high debt" groups in a given quarter resulted from an expansion of the scale of activity, and thus, from an increase in the production potential. These observations were reflected by greater outlays for production, which was financed with both equity and the borrowed capital. The surge in the inflows from operating activity in the *i*th quarter due to an increased use of short-term capital was estimated on the basis of the rate of return from 1 PLN of those financial inflows in the *i*th quarter. The influence of a higher level of short-term loan employment was established on the basis of an analysis of a linear regression conducted in agricultural holdings representing the analyzed agricultural type and characterized by the highest debt level. The increase in the level of inflows from operating activity was connected with an increase in the livestock density.

19th International Farm Management Congress,
SGGW, Warsaw, Poland

IFMA19 Theme:

Risk & Sustain

CASH FLOWS IN THE OPTIMIZATION OF CAPITAL STRUCTURE IN AGRICULTURAL HOLDINGS...

Table 2 presents the aggregate optimization results for the "granivores" type of holdings in two groups differentiated on the basis of their debt levels. In the case of holdings with a lower debt level the share of external sources of financing in total liabilities in relation to actual data increased by 16.9% points. On the other hand, the level of income from a family-owned agricultural holding in the "low debt" group, both in the case of actual data and in the case of model data, approximated the same value. In the case of these holdings it resulted from a high employment level of short-term subsidized sources of financing, the cost of which did not lead to an increase in income from a family-owned holding. The obtained financial surplus was used for satisfying the demand for capital linked to covering the expenses incurred because of the greater livestock density. Nevertheless, the situation should be assessed as beneficial in comparison to the level of total assets in this group of holdings due to success in maintaining approximately the same level of income and in carrying out an investment project of high value.

In the holdings from the "low debt" group a relatively higher level of employment of short-term commercial loans was noted amounting to 9.0% in the total liabilities structure (8.8% points) as compared to model data for the "high debt" group. This resulted from restrictions in obtaining subsidized sources of financing, which depended on the size of current assets, the level of which, in turn, was a condition for maintaining financial liquidity. The loan structure in holdings with the lowest and the highest debt levels was also characterized by a proportion of 3 (commercial) to 1 (subsidized) sources of financing. In holdings with the highest debt level, the majority of commercial loans utilized in the course of the year were repaid in the last quarter.

The debt structure optimization demonstrated a dominating position of long-term subsidized loans, the share of which was 63.8% in the "low debt" group and 75.0% in the "high debt" group. In holdings with the highest debt level, the share of subsidized loans was small (0.2%). This resulted from a lower level of demand for short-term capital in this group of holdings, as compared to those with the lowest debt level. It was also linked to a higher cost of obtaining subsidized loans and a reasonable decision to pay these loans first due to this higher cost. In holdings with the highest debt level on the other hand, short-term sources of financing were used on a larger scale in the course of the production cycle as compared to the "low debt" group. In "high debt" holdings a higher level of expenses from financial activity was observed due to repayment of short-term debts in a given business year (75.8%) in comparison to the value of financial inflows. In the "low debt" group the proportion of expenses to financed inflows was 71.0%. This resulted from a larger activity scale in holdings with the highest debt level, which is linked to a higher financial burden from investment projects carried out in the current period and repayment of long-term liabilities from previous years.

In holdings with the highest debt level for carrying out planned investment projects, which enables an increase in production potential, the optimum capital structure contributed to an increase by 15.6% in income from a family-owned agricultural holding. This situation indicates an increase in production potential in those holdings, with a simultaneous possibility to carry out investment projects and to achieve higher return rates linked to an increase in the effectiveness of production. This also indicates a positive influence of the increase in the level of employment of borrowed capital for the production purposes, which resulted from insufficient recapitalization of the activity of those holdings in the previous base period.

Table 2. The capital structure optimization results for "granivores" type of holdings (end-of-the-year figures)

| Details | Groups of farms according to debt level | | | |
| | Low debt | | High debt | |
	Actual data	Model data	Actual data	Model data
Livestock density	25.4	33.4	47.4	55.4
Total debt ratio (%)	1.7	18.6	27.7	35.7
Debt structure (%) - long-term subsidized loans	-	63.8	-	75.0
- short-term subsidized loans	-	27.2	-	24.8
- short-term commercial loans	-	9.0	-	0.2
Share of operational inflows connected with additional employment of borrowed capital (%)	-	17.2	-	10.9
Cash flow balance dynamics ratio from operating activity in the model as compared to actual data (%)	100.0	98.6	100.0	115.7
Financial inflows structure (%) - long-term subsidized loans	-	29.2	-	20.9
- short-term subsidized loans	-	53.1	-	59.3
- short-term commercial loans	-	17.7	-	19.8
Income dynamics ratio in the model as compared to actual data (%)	100.0	98.6	100.0	115.6
ROE (%)	7.8	7.7	12.7	14.7
ROA (%)	7.6	5.8	8.8	8.9

Source: own elaboration

In the group with the highest debt level the investment assumptions and the adopted financing methods contributed to obtaining an increase in the operating activity balance by 15.7% as compared to actual data. In those holdings a higher level of cash has also been observed, which ensured solvency and financial liquidity, as well as the repayment of loans incurred in the previous periods in the course of the following quarters. The reason underlying this situation was a larger activity scale, which was connected to generating a higher disposable financial surplus from operating activity in comparison to the "low debt" group of holdings.

The effect of employing borrowed capital for the purpose of increasing outlays for production contributed to an increase in operational inflows in "low debt" holdings by 17.2%, and by 10.9% in the "high debt" group. A higher share of inflows from operating activity in the "low debt" group was linked to a greater importance of the investments planned to improve the operational effectiveness as compared to the holdings with a higher debt level with a larger scale of activity, which was evidenced by a higher livestock density at the stage of actual data. In the value-based approach, the increase in those inflows was greater in holdings with the highest debt level and resulted from a higher level of employment of short-term sources of financing as compared to the "low debt" group. It was also linked to an increase in the effectiveness of capital employment in

IFMA19 Theme:

19th International Farm Management Congress,
SGGW, Warsaw, Poland

Risk & Sustain

CASH FLOWS IN THE OPTIMIZATION OF CAPITAL STRUCTURE IN AGRICULTURAL HOLDINGS...

those holdings, which was achieved by increasing operational inflows for production purposes. A higher level of total indebtedness in the "high debt" group contributed to the increase in the effectiveness of production in those holdings, which is evidenced by higher rates of ROE (2.0% points) and return on assets (ROA) (0.1% points) in the data obtained for the optimization model in relation to the initial-level data.

In the "low debt" group of holdings, an increase in debt and an investment project carried out simultaneously did not contribute to an increase in income levels from a family-owned agricultural holding, as compared to the actual data (a decrease of 1.4% could be observed). It resulted from a worse financial condition of these holdings and from a higher burden on the current activity in the form of investment expenses in the first year of the project implementation. After the optimization the return ratio decreased by 0.1% points for ROE and by 1.8% points for ROA. These observations prove the low effectiveness of the operating activity of the "low debt" group of holdings.

The optimization of sources of financing in view of an investment project and the continuous complementation of the demand for capital with short-term commercial loans made it possible to increase the ROE rate, while obtaining higher income levels from a family-owned agricultural holding and maintaining the solvency level only in the "high debt" group of holdings. The increase in indebtedness to the level of 35.7%, coupled with its effective utilisation in holdings, contributed to an improvement of the financial standing and to a development of the production activity. In an optimization task thus formulated it is assumed that a higher debt level is accepted in a situation in which a set goal is achieved by striving to maximise income from a family-owned agricultural holding.

4. Conclusions

1. This study presents the results of capital structure optimization based on the analysis of cash flows in agricultural holdings with animal production, with account taken of debt levels. On the basis of the research conducted the following conclusions have been drawn:

2. The employment of borrowed capital and the achievement of an optimum capital structure with regard to effectiveness in agricultural holdings with animal production characterised by a higher debt level were shaped mainly by external sources of financing. A higher debt level did not significantly limit the stability of financing and the possibility to increase the value of equity. This resulted from an increase in income from a family-owned agricultural holding coupled with the possibility to keep this source of internal financing within the holding.

3. Complementing cash shortfalls with short-term borrowings in the course of the operational cycle enabled the expansion of the scale of activity. This resulted from both the investment expenses incurred, and higher outlays for production in the case of those holdings. This indicates an improvement in the effectiveness of activity by making use of equity and borrowed capital, thus changing the capital structure.

4. The structure of external sources of financing within the framework of optimization results was characterised by a higher share of short-term loans in liabilities of agricultural holding with lower debt levels, as compared to the ones with the highest level of borrowed capital employment. This resulted from a higher general demand for capital in the case of these holdings.

5. Among holdings with a lower debt level a greater increase in the inflows from operating activity was noted due to the employment of short-term borrowed capital in relation to those with the highest share of payables in the liabilities (structure of inflows). It was generally connected with a lower surplus of own funds in these holdings; the surplus was not sufficient to finance either the investments or the expansion of the scale of activity.

6. In holdings with a higher debt level additional employment of borrowed capital, as compared to the previous structure of sources of financing, enabled an increase in ROE. It shows a potential for using a financial leverage effect by increasing the operational profitability of assets in this group of holdings. In those holdings the optimization results pointed to the optimum capital structure which reflected the order of priority for the farmers' selection of the sources of financing, which was linked to a dominating position of subsidized loans in the debt structure. Maintaining such a capital structure contributed to the maximization of the operational balance and of the income from a family-owned holding.

5. References

Behr P., Guttler A., 2007. Credit Risk Assessment and Relationship Lending: an Empirical Analysis of German Small and Medium-Sized Enterprises. Journal of Small Business Management vo. 45(2).

Kowal R., 2009. Statystyczne modelowanie przepływów pieniężnych w przedsiębiorstwach w warunkach niepewności. Rozprawy i Studia T. DCCCXV nr 741, Wydawnictwo Uniwersytetu Szczecińskiego, Szczecin.

Kowalczyk J., Kusak A., 2006. Decyzje finansowe firmy – metody analizy. Wydawnictwo C.H.Beck, Warszawa.

Lopez-Gracia J., Sogorb-Mira F., 2008. Testing tarde-off and pecking order theories financing SMEs. Journal Small Business Economic vol. 31.

Maślanka T., 2008. Przepływy pieniężne w zarządzaniu finansami przedsiębiorstw. Wydawnictwo C.H. Beck, Warszawa.

Mądra M., 2008. Hierarchia źródeł finansowania w mikro przedsiębiorstwach rolniczych. Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania, nr 10, Wydawnictwo Uniwersytetu Szczecińskiego, Szczecin.

Michaelas N., Chittenden F., Poutziouris P., 1999. Financial Policy and Capital Structure Choice in U.K. SMEs: Empirical Evidence from Company Panel Data. Small Business Economics vol. 12.

Michalski G., 2005. Płynność finansowa w małym i średnim przedsiębiorstwie, Wydawnictwo Naukowe PWN, Warszawa.

Modigliani F., Miller M.H., 1958. The Cost of Capital, Corporate Finance and the Theory of Investment. American Economic Review, vol. 48.

Śnieżek E.M., 2008. Sprawozdawczość przepływów pieniężnych – krytyczna ocean i propozycja modelu. Wydawnictwo Uniwersytetu Łódzkiego, Łódź.

Tokarski A., 2007. Strategie finansowania działalności przedsiębiorstw produkcyjnych. Wydawnictwo Adam Marszałek, Toruń.