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**The cost of capital in the effectiveness assessment
of financial management in a company**

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The cost of capital in the effectiveness assessment of financial management in a company

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Abstract: Financial management in a company is a decision process subject to achievement of the main goal of the company, that is its value maximization. Estimation of the cost of capital is of great significance in this area. The cost of capital affects the key decisions of the board concerning the scale of investment undertakings, determination of the target, demanded amount and pace of capital growth, shaping of optimal capital structure and other areas of financial management in a company such as capital budgeting, processes of takeovers and fusions etc. It is also a parameter in calculating the return on investment and in other analyses. The utilization of information about the cost of capital in the decision-making process in the company is strictly connected with the assessment of financial management in the company using market value added. The objective of the article is to review the theory confirming the thesis that the effectiveness assessment of financial management in the company, in the context of market value added growth, is largely dependent on the cost of capital in the company. The article is of theoretical-cognitive and methodological character. It constitutes a reason for further empirical research confirming the relation proved in the theory between the cost of capital and company value, which is a basis for the effectiveness assessment of financial management in the company.

Introduction

Financial management in a company is a decision process subject to the achievement of the main goal of the company, that is value maximization. Awareness of the company value has great significance in the business activity of each company and constitutes the most important criterion of making decisions by the owners and executives. In theory and practice a view is common about the key significance of the cost of capital in shaping the company value. It is one of the basic and still discussed issues raised in

the field of corporate financial management (Caputa, 2010, pp. 88-100). The purpose of the article is a review of theory confirming the thesis that the effectiveness assessment of financial management in the company is largely dependent on the cost of capital in the company. The subject of the research are the considerations of F. Modigliani and M. Miller as they are the first model solutions related to the problem raised. The author also related to other models created on the basis of these considerations, which may be an alternative. The article is of theoretical-cognitive and methodological character and constitutes a reason for further empirical research that confirms the relation proved in theory between the cost of capital and company value, being an effect of the activities undertaken within the frames of corporate financial management. In the research conducted a method of literature studies was used, both a domestic and foreign one.

The outline of the problem of the cost of capital evaluation

In the considerations concerning the company value it is very important to define the cost of capital precisely. The cost of capital is generally defined as the expected return rate by the investors (both owners and creditors) on the invested capital at the particular risk level. It is connected with the alternative cost, that is the expected return rate on investment that the investors resign from when they choose a particular type of activity and resign at the same time from other possibilities available in a given moment (Compare Duliniec, 2001, p. 149; Kerins at al., 2004, pp. 385-405).

Estimation of the cost of capital is connected with a division of capital into debt capital and equity and consists in a separate calculation of the alternative cost for the particular financing sources of debt capital and equity as well as in calculation, on their bases, the weighted average cost of capital in which target capital structure determines the weights of the separate components (Jonek-Kowalska, 2011, pp. 117-136).

Equity is the company owner's or owners' contribution. In the moment of company establishment it constitutes a sum of resources (assets) brought in by the owner (owners). In the course of conducting the business activity it will be increased by the value of profits achieved. Debt capital is a capital left at the company's disposal for a definite period of time and after that it must be returned. A further division of debt capital may be made into a long-term one that includes long-term credits and bonds, long-term bank loans and other long-term liabilities that will be paid off after over 1 year and into short-term debt capital that comprises of credits, bonds, bank loans and other trade payables as well tax and remuneration liabilities due in less than one year.

In order to determine the weighted average cost of capital there should be the cost of capital calculated coming from different sources engaged in business financing, e.g. the cost of shareholder capital, the cost of bank loans, the cost of capital obtained from bonds sales etc. (Che & Sethi, 2014, pp. 1-34). Each element of capital is subject to different pricing depending on the way of determining the benefits for the capital provider, tax solutions etc. Next, the costs of capital are “weighted” by the share of the particular sources in the capital structure. In a general form, weighted average cost of capital (WACC) may be expressed by the following formula (Groth & Anderson, 1997, p. 477; Jajuga & Słowski, 1997, p.149; Brigham, & Gapenski, 2000, p. 238):

where:

$$WACC = \sum_{i=1}^n w_i K_i$$

where:

w_i – i-number of the sources of capital,

K_i – cost of capital coming from the source of i-number,

n – number of capital sources.

This formula is also presented in a more general form that includes the cost of equity that is obtained from common and preferred stock issuance as well as the cost of debt capital:

$$WACC = w_d k_d (1-T) + w_p k_p + w_e k_e,$$

where:

w_d – debt capital,

w_p – capital from preferred stock issuance,

w_d – capital from common stock issuance,

k_d – cost of debt capital,

k_p – cost of capital from preferred stock,

k_e – cost of equity from common stock.

The return rate on the particular types of capital is the required return rate on the capital invested by the owners and creditors, determined using market criteria. Beside the return rate, the weighted average cost of capital in the company depends on the capital structure shaped in the company (Ickiewicz, 2001, p. 208).

Determination of the capital structure for the purpose of the cost of capital estimation is connected with some problems. They are connected with various ways of defining the capital structure in the company. The notions of capital structure, liabilities structure and financing sources structure are interchangeably used. These are not fully identical notions though. Defining the capital structure is grounded on the basic division of capital into equity and debt capital as well as on a long-term and short-term

capital. One of the depictions of capital structure is its perception as the share of debt capital and equity in financing the company's activity (Sierpińska & Jachna, 2003, p. 255; Bień, 1998, p. 174; Turek & Jonek-Kowalska, 2009, pp. 16-20; Janasz, 2010, p. 35; Jerzemowska, 2006, p. 155; Gabrusewicz, 2005, p. 115). However, there is another approach possible that debt/equity relation determines the structure of company's financing, furthermore, the capital structure is a relation of long-term debt and equity (Moyer et al., 1992, p. 518; Weston & Copeland, 1992, p. 493). Consequently, the capital structure is a part of financing structure which, beside long-term debt and equity, also takes short-term debt into account (Petty et al., 1993, p. 354). Such approach is similar to the considerations of F. Modigliani and M. Miller concerning the relation of debt and equity in the company. According to them, the most common feature of debt as an element of capital structure is payment of interest on debt incurred.

Effectiveness measurement of corporate financial management in the view of company value – model solutions

Corporate financial management should be subject to the achievement of the main goal of the enterprise, that is value maximization and in the view of this category, the effectiveness of management should be assessed. At the same time one should pay attention to a special role of the cost of capital in the process of company value pricing and in the process of effectiveness assessment of corporate financial management too. The relation of company value and the cost of capital was visibly emphasized in the theory of two Noble Prize winners - F. Modigliani and M. Miller (1958), who in 1958 published the article „*The Cost of Capital, Corporate Finance and the Theory of Investment*”. They proposed the first model solutions in this area, determined as MM models from their initials. They based their research on the following assumptions:

- each company may be classified to the groups of different risk level (risk class). The companies from the same groups are burdened with the same level of operational risk, measured as standard deviation of return on equity,
- transactional costs of securities issuance or turnover are not included in the analysis, the securities are freely divided and the information about the capital market is commonly accessible and free of charge,
- there are no taxes,
- companies do not go bankrupt, therefore the interest on capital is the same for everyone as the interest rate on the capital market is free of risk.

On the basis of such assumptions made, two theorems were formulated called **MM model without taxes**. Proposition I states that the company

value does not depend on the capital structure and the weighted average cost of capital (WACC) does not depend on the amount of debt and is equal to the cost of equity of the company that does not use debt capital and it is in the same risk class. In this case the company value is determined using the following formula (Pluta, 2000, p. 120):

$$V_U = V_L = \text{EBIT} / \text{WACC} = \text{EBIT} / k_{eU},$$

where:

- V_U – value of unlevered company,
- V_L – value of levered company,
- k_{eU} – cost of equity of unlevered company,
- EBIT- earnings before deducting interest and taxes,
- WACC – weighted average cost of capital.

The second theorem of MM model without taxes relates to the mathematical dependence between changes in the cost of equity and depending on the degree of financing by debt capital in the company. The formula describing Proposition II of MM model is as follows:

$$k_{eL} = k_{eU} + (k_{eU} - k_d) (D/E),$$

where:

- k_{eL} – cost of equity of levered company,
- k_d – cost of debt,
- D – market value of debt,
- E – market value of equity.

According to the above, the benefits achieved thanks to using a cheaper debt capital (k_d) are levelled by the increase in the cost of equity (k_e). Consequently, obtaining debt capital by the company affects neither the value of weighted average cost of capital nor the company value.

After **introducing income tax to MM model** the value of the company using debt capital exceeds the value of the company financed by equity only. The difference is the value of so called tax shield, also called deferred tax (DT). It is the value of tax savings connected with deducting the interest on debt from the tax base. This dependence may be showed as (Proposition I):

$$V_L = V_U + DT.$$

The value of unlevered company (V_U) results from the following formula:

$$V_U = E = \text{EBIT}(1-T) / k_{eU}.$$

According to the above, the company may increase its value by increasing the share of debt capital which may, in theory, eliminate equity from the capital structure, but then the issue of risk arises.

Proposition II in the MM model with taxes, similarly to the model without taxes, concerns the amount of the cost of equity. This cost (k_{eL}) is equal to the cost of equity of unlevered company and risk premium, which

in this case depends on a difference between the cost of equity of unlevered company and the cost of debt capital, tax rate and the amount of debt-to-equity ratio:

$$k_{eL} = k_{eU} + (k_{eU} - k_d) (1-T) (D/E),$$

According to the above, the cost of equity rises along with the amount of debt incurred. However, in this case the growth pace of the cost of capital is slower than in the MM model without taxes. The value of decreasing the growth pace in this model is described by the (1-T) expression.

In the year 1977 M.H. Miller proposed the next version of the model that allows examining the relation between the company value and the cost of capital, called **Miller model**. This version included, apart from the income tax rate, also the personal taxes paid by the investors. According to this approach, the value of company financed by equity only is indicated by the formula:

$$V_U = \text{EBIT} (1-T_c) (1-T_e) / k_{eU},$$

where:

T_c – corporate income tax rate,

T_e – shareholder income tax rate on equity.

Furthermore, in case of financing using debt capital, the company value is a sum of the value of unlevered company and value added achieved on tax savings, as presented in the formula:

$$V_L = V_U + [1 - (1-T_c) (1-T_e) / (1-T_d)] D,$$

where:

T_d – personal tax rate on income from debt.

Within the frames of the model presented, Miller concluded that the value of tax shield is shaped by the corporate, shareholder tax rate and tax rate on income from debt (T_c , T_e , T_d) and by the market value of debt (D). The Miller Model works properly with the assumption that the market is in the state of equilibrium.

On the basis of MM theory or parallel to it new theories were created concerning the relation of the cost of capital with the company market value. They emphasize the relation of the cost of capital with the capital structure. One of theories that assumes a close relation of the optimal capital structure and the cost of capital is **static trade-off model**, grounded on the assumptions of F. Modigliani and M. Miller (Modigliani & Miller, 1958, pp. 261-297). In the static trade-off model it is presumed that the capital structure is optimal when the marginal value of tax benefits from additional debt is equal to the marginal value of the cost of financial distress resulting from increased debt. Along with debt increase the company market value grows until some moment (the weighted average cost of capital is decreased). After reaching the point in which the benefits

from using the financial leverage are equal to the increased risk connected with using debt capital, further debt increase causes decreasing the company market value. This point indicates the optimal capital structure (the weighted average cost of capital obtains there the lowest level and the company market value is the greatest) (Iwin-Garzyńska, 2010, p. 66). After introducing the income tax rate, the point of optimal capital structure is moved in the result of tax shield appearance. The tax shield causes that the cost of debt decreases. On the other hand, equity may be more expensive due to the income tax on dividend.

An extension of the considerations above is **substitution theory** that deals with the problem of mutual relations of benefits and costs connected with introducing debt capital into the company in the context of capital structure optimization in the company (Myers, 1984, p. 575). This theory assumes that the value of assets and total capital invested in the company is perpetual and consistently with this assumption, an optimal capital structure is sought that provides the highest company value. According to the substitution theory, shaping of the value of levered company is influenced by both tax benefits (resulting from including the interest on debt in the tax costs) as well as the costs of financial distress coming from the risk of insolvency that accompanies the utilization of debt capital (Nawrocki, Jonek-Kowalska, 2013, pp. 539-559). Consequently, the value of levered company may be expressed as follows:

$$V_L = V_U + PV_{\text{tax shield}} - PV_{\text{CFD}}$$

where:

V_L – value of levered company,

V_U - value of unlevered company

$PV_{\text{tax shield}}$ – present value of tax benefits from the tax shield connected with the interest on debt,

PV_{CFD} – present value of the costs of financial distress (Michalak, 2014).

The application of the cost of capital in practice of the company value pricing

Effectiveness assessment of management in the view of company value growth rises a need to adjust some universal, commonly accepted measures in theory and practice. The traditional financial indicators based on accounting data do not include all factors that affect the company value. Historically, the oldest asset methods of company value pricing use past data that may deviate from the current values and do not include the ability of the particular asset components of the enterprise to generate earnings.

These methods do not take the change of currency value in time and the cost of capital into account. Their application in practice is rare. Nevertheless, greater popularity is gained by the measures of company value growth, based on the company ability to generate earnings. Such methods include: Discounted Cash Flow (DCF) and Dividend Discount Model. The first of them estimates the company value as a sum of present value of future cash flow generated by the company (Szwajca, 2010, pp. 212-223). The second one is based on a dividend where the company value is indicated by a discounted flow of future dividends. An increasingly popular alternative for DCF method is Economic Value Added (EVA). These methods provide the same results if the same assumptions are used in analysis, however, according to many authors, the EVA conception has some features that the DCF methodology lacks. It is emphasized that EVA is more complex and clearer in the context of monitoring the process of company value creation (Compare Stewart, 1991). Moreover, the EVA conception allows confronting the internal company results directly with the way they are perceived by the market, using Market Value Added (MVA). The cost of capital used for the company financing has great influence on the company value calculated by these methods (Compare Michalak & Sojda, 2014).

Market Value Added (MVA) measures the company value generated on the market in relation with the invested capital and constitutes a sum of discounted future value of EVA of the company (Boulton et al., 2001, p. 16). The method of economic value added is based on the calculation of operating profit, thus it refers to the operating part of company's activity only, abstracting at the same time from less important areas of activity for the company's existence. However, it also includes tax burden. Therefore, it may be stated that it reflects the actual potential of the company in terms of value creation. Furthermore, economic value added pays attention to the interests of investors (Basak & Pavlova, 2013, pp. 1728-58) using the benefits expected by them in its formula. It includes the cost of capital engaged in the company's activity. At the same time EVA mitigates the disadvantages of the pricing methods presented earlier. It is worth adding that the conception of market value added (MVA), which uses the economic value added, beside the aforementioned factors important for the company activity, enables inclusion of time flow as well. This is possible because MVA constitutes a flow of discounted EVA in time.

In practice, for EVA calculation, Net Operating Profit After Taxes (NOPAT) is used (Compare Dudycz, 2001, pp. 198-201), decreased by the earnings expected by investors, expressed as a relation of Invested Capital (IC) and the expected return rate on the invested capital expressed by

Weighted Average Cost of Capital (WACC). It may be presented using the following formula (Caputa, 2009, pp. 8-13):

$$EVA = NOPAT - WACC \times IC$$

where:

NOPAT – Net Operating Profit After Taxes,
WACC – Weighted Average Cost of Capital,
IC – Invested Capital.

In practice, *NOPAT* is net operating profit after taxes, that means a profit before deducting the costs of financing the company by debt capital but after deducting tax expressed in cash. *NOPAT* may be therefore calculated decreasing the operating profit by tax burden:

$$NOPAT = EBIT \times (1 - T)$$

where:

NOPAT – Net Operating Profit After Taxes,
EBIT – Earnings Before Income Taxes,
T - Income Tax rate.

On the basis of *EVA*, *MVA* is calculated. It is a sum of discounted *EVA* that will be achieved in the future periods $t=1,2,3,\dots,n$ and it reflects the premium obtained on the market due to the invested capital in the company (Ehrbar, 1999, p. 21):

$$MVA_t = \sum_{t=1}^n \frac{EVA_t}{(1 + WACC)^t}$$

where:

t – period of time,
MVA_t – Market Value Added,
WACC – Weighted Average Cost of Capital,
EVA_t – Economic Value Added.

MVA expresses the present value of *EVA* obtained in future periods $t=1,2,3,\dots,n$. According to the above, if the company generates a flow of positive *EVA* values, the additional positive value will be gained, however, if the value of discounted *EVA* is negative, the process of value “damage” will occur. *MVA* provides a basic statement that a new value will only be created if the invested capital in the company provides a return higher than break-even point, indicated by the cost of capital.

As it results from the formulas above, the cost of capital is a very significant parameter appearing in *MVA* as a discounted rate. It also appears in the process of *EVA* calculation as the expected return rate on the

invested capital by the investors in the company. This capital may be of equity or debt character.

Conclusions

The review of theory made above allows concluding that there are many conceptions confirming a close relation between the cost of capital and the company value, which are the measures of effective corporate financial management. The cost of capital appeared as the value pricing parameter in the middle of XX century in the conceptions of F. Modigliani and M. Miller and in the considerations continued by M. Miller himself. On the basis of these conceptions new models appeared in which the influence of the cost of capital on the company value is proved. These include: static trade-off model, signaling theory, agency dilemma, free cash flow theory. Taking into account that there is a number of methods confirming the relations between the cost of capital and the company value that have been created in the recent several dozen years as well as considering the current solutions used for this purpose in the practice of corporate financial management, the thesis stated at the beginning is positively verified.

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