Capital Management within the Frames of a Cluster

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***Abstract*- In the context of international economics globalization and the activity of economic entities being increasingly innovative in nature the methods of managing the capital of the enterprises and organizations implementing their investment projects and solutions become more involved. With the variety of target models of development for an enterprise to effectively implement them it is necessary to estimate the limiting efficiency of capital in use at an enterprise. Marginal efficiency of capital is calculated as the ratio of capital growth increment to the increment of weighted average cost of capital (WACC).**

Key words- the cost of equity, the cost of debt, the weighted average cost of capital.

I. INTRODUCTION.

In the context of international economics globalization and the activity of economic entities being increasingly innovative in nature the methods of managing the capital of the enterprises and organizations implementing their investment projects and solutions become more involved. From the one hand, an innovative project even unaccomplished despite the lack of its economic efficiency can have positive results rating in the form of new technologies framing and intellectual property creation that are promising for patenting and subsequent sale by way of staff training and new management procedures elaboration. But from the other hand, any investment project requires the creation of optimal capital structure (OCS) making possible to minimize the expenses involved in its use.

What is the "cost of capital". This question has vexed at least three classes of economists:

the corporation finance specialist concerned with the techniques of financing firms so as to ensure their survival and growth;

the managerial economist concerned with capital budgeting;

the economic theorist concerned with explaining investment behavior at both the micro and macro levels. [15]

A project's cost of capital is the minimum expected rate of return needed to attract the required capital. It is an opportunity cost – the rate of return on investing in the next – best alternative to the project. [10] A capital budgeting model should account not only the effects of the investment decision, but also for the effects of the financing decision and the interactions between the two decisions. [14]

The cost of the capital consists of the cost of equity and the cost of debt. Firms that are profitable often use some of their profit to repay debt, and, as a result, reduce their leverage ratio over time. [8] The weighted average cost of capital (WACC) is the cost of capital required on the whole capital employed (debt plus equity capital invested in the company). [6] The WACC is composed of the cost of equity, the cost of debt, the corporate leverage ratio, and the corporate tax rate. The return of equity is important, and it is more volatile than the return of debt. Thus, less investment should be undertaken be a high cost firm. [13] The cost of equity increases at an increasing rate as more debt is used in the company's capital structure. Capital structure and the cost of equity are unbreakably linked. In particular, capital structure differences between sample companies and the regulated company must be properly considered in establishing the cost of capital.[17]

At the same time one analysis helped answering that value impacts of the time – dependent WACC changes are negligible. The value contributions arising arising from changes in the cost of goods sold (COGS) or working capital, defined as the sum of inventories and trade receivables reduced by trade payables. [2]

II. OBJECTIVES.

With the variety of target models of development for an enterprise to effectively implement them it is necessary to estimate the limiting efficiency of capital in use at an enterprise. The adherents of the subjective theory of value (William Stanley Jevons, Alfred Marshall, Carl Menger, Friedrich von Wieser, Eugen Böhm Ritter von Bawerk, Léon Walras; John Bates Clark, Knut Wicksell) estimated the value as the subjective evaluation of commodities being determined by its utility (MU). The given trend of value theory considers the theories of the customer's rational choice that explain the process of value formation from a perspective of maximum utility of the given transaction for a customer. The given theory implies two approaches to the analysis of utility and demand: Quantative (cardinal utility) and ordinal (ordinal utility). In compliance with the theory of a rational behavior to maximize the utility of goods consumption an individual must be able to compare and measure its value received from consumption of separate goods or their sets. The ability of goods and services to satisfy desires was called the utility.

The quantity theory of utility based on the presumption of direct measuring the utility of good and, consequently, of possibility to compare separate goods was suggested in the late 19th century by W. Jevons, L. Walras and C, Menger. These defenders of the quantity theory put forward an assumption of a possibility for an individual to directly measure the utility of various goods with the help of special hypothetical units. It can be assumed that the given postulate was a precondition for uprising of expert

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evaluation method widely used in enterprise valuation activities.

At a later stage the theory of utility gained traction in the theory of marginal utility which formulated two Gossen's laws: 1) the principle of diminishing marginal utility and 2) total utility reaches its maximum when marginal utilities of goods are proportional to their prices. [5]

The given postulates of the marginal utility theory are reflected in the principles of valuation activities. A.G. Gryaznova and M.A. Fedotova underline the principle of marginal productivity: variations of production factors can either enlarge or diminish the value of the object. This implies the principle of a business evaluation the core of which lies in the following: in the process of adding resources to the main production factors net output tends to be increased faster than rate of costs growth, however, after reaching the certain point gross return though grows but in decelerating rates. This slowdown takes place until value growth becomes less than expenses involved in added resources. [9] The marginal product of labour and capital were defined by Kirshin I.A. [11]

Marginal efficiency of capital is calculated as the ratio of capital growth increment to the increment of weighted average cost of capital (WACC). At estimating marginal efficiency of capital the following variants are possible:

to improve the financial standing of the company at simultaneous growth of cost effectiveness and WACC the index of marginal efficiency of capital must exceed unity;

in case of simultaneous decrease of return on equity and WACC indexes with a view to retain hold of business solvency must be less than unity;

in case of differently directed tendency of return on equity and WACC indexes two values of marginal efficiency of capital are possible.

The optimal capital structure is formed under the influence of factors reflecting the inner and outer company environment. These factors are shown in Table 1.

TABLE 1.
FACTORS OF OPTIMAL CAPITAL STRUCTURE FORMING AT AN ENTERPRISE.

Factors	Institutional	Financial-economic	Managerial
Outer environment	- legislative requirements to minimal size of capital types; - own capital size at different activities implementation.	- investment climate, financial policy in the country; - the country's operational taxation system; - discount rate size ; - the trends of market environment in the industry and region.	- legal and regulatory framework of corporate management; - the social security system on macroscale level; - the level of criminalization and corruption.
Inner environment	- types of contract relations; - the conflicts between agents; - protection against opportunist behaviour; - transaction management mechanisms.	- company's life cycle; - asset profile according to degree of liquidity; - company's capital absolute value абсолютная.	- the level and quality of corporate and financial management and control; - corporate culture efficiency; - efficiency of managerial solutions taken at the enterprise; - enlargement of intellectual capital share in the structure of company's asset profile.

At present we know several patterns of development for an enterprise and its systems of management:

- profit maximization model;
- transaction expenses minimization model;
- sales volume maximization model;
- company's rates of growth maximization model;
- effective competitive advantage procurement model;
- value added maximization model;
- company's market value maximization model.

The value of the WACC will be minimal for the company within the frames of a cluster since the activities of an enterprise within the cluster is stipulated by the following advantages common for each entity individually:

- depreciation of transaction expenses;
- an opportunity to apply «economies of scale»;
- diminish the production unit manufacturing cost;
- implementation of Research and Advanced Development results received according to the cluster participants' requests;
- employing the positive effect of key competence in the sphere of managerial decisions taking.

III. RESEARCH METHODOLOGY.

Theoretical investigations and fundamental research in the field of capital structure and its value were elaborated by Franco Modigliani and M. Miller in 1958 and from then onward are considered to be one of the ground-breaking principles in the contemporary corporate finance. In actual practice their first theorem M-M is more often regarded not as yet more proof that variations of capital structure do not affect a company value but rather as a variant of the list of conditions not fullfillment of which makes the company dependent on its capital structure. M-M model implies invariance of debt absolute value in a company capital along with the availability of permanent free cash flow. A generalized model allows arbitrary change of debt absolute value against the background of evaluation and do not impose any restrictions on the structure of free cash flow. As a matter of actual practice we see mixed

financing where a company's capital is formed by means of own and borrowed capital. In this case a part of free cash flow resulted from asset turnover will be allocated for execution of obligations involved in borrowing costs. This involves the cash flow for debt investors (CFD) appearing to be the sum of interest charges, out-payments for amortization of debt and new borrowings. Interest rate for borrowed capital not depending on its type determines the proportions for sharing free cash flow between the investors-creditors and the company owners (shareholders) as well as the sum of potential gains from «the effect of tax shield» (TS). This effect originates from statutorily prescribed opportunity to diminish tax base by the value of interest charges. And then free cash flow to equity (CFE) is formed.

It turns out that for any moment of time t the sum of free cash flow for the certain period CFE for share investors (shareholders) and cash flow CFD for debt investors (creditors) is equal to the sum of free cash flow FCF and tax shield TS of the given period:

FCF + TS = CFE + CFD

And from the other hand,

FCF + TS = CCF, where

the sum of free cash flow and tax shield is equal to the amount of cash flow for total capital of the company. On one side, the amount of cash flow for total capital of the company must tend to maximum but on the other side, the expenses involved in the use of this capital must go to minimum, what finds its way in the term « weighted average cost of capital» (WACC) of the company.

In one article was offered the next formula of the WACC:

$$WACC_{pre\text{-}tax} = G*Rd+((1-G)/(1-T)*Re,$$

where G is the level of gearing, T is the tax rate, Rd is the pre-tax cost of rate and Re is the post-tax cost of equity. [4]

In other article we could see the term after-tax-weighted average cost of capital (ATWACC) to denote the after-tax value of all the components of the WACC. In the terminology of this paper, the sum of after-tax equity return, income taxes and interest expence is equal to the before-tax weighted-average cost of capital or the BTWACC. [17]

Finance theory offers several important observations when estimating company's WACC. The costs should equal the investors' anticipated internal rate of return (IRR) of future cash flows associated with each form of capital.[3]

Iç. FINDINGS AND ANALYSIS.

The enterprise OJSC «Nizhnekamskneftekhim» is one of the participants of petrochemical cluster in the Republic of Tatarstan produced chemical products for such enterprises, as shown in table 2, 3,4.

TABLE 2.
PARTICIPANTS OF PETROCHEMICAL CLUSTER IN THE REPUBLIC OF TATARSTAN.[16]

Group	Cluster participants	Industry sector
1	NPTC, OJSC TAIF – NK, NNKh, HSH, KOS, Chemical Plant named after Karpov, SNRG Logistic LTD. KPSR	Mineral industry, processing industry
2	Scientific Research Institutes	Service industries
3	Technopolis Khimgrad	Infrastructure
4	State Authorities	Legal and regulatory framework

TABLE 3.
THE ENTERPRISES USED THE PRODUCTS OF OJSC «NIZHNEKAMSKNEFTEKHIM».

Number	The name of enterprises used the products of OJSC «Nizhnekamskneftekhim» (NNKh)	The types of chemical products
1	The Industrial park "Kamsk's glade"	Polymeric products
2	OJSC "Polymatize"	Nonwoven fabrics
3	OJSC "Polimercoldness technique"	Polymeric sprinklers and water catchers
4	OJSC "Chemical plant named Carpov V."	Product of the inorganic chemical industry
5	OJSC "Kamsk's plant of polimer materials"	Concentrate of technical carbon
6	OJSC "Agricultural plant'	Polymeric products for construction of agricultural industry

TABLE 4.
THE MAIN INDICATORS OF THE OJSC «NIZHNEKAMSKNEFTEKHIM» 2008-2012.

Indicators	2008	2009	2010	2011	2012
Gross sales of products, billion rubbles.	71	60.3	94.4	122.7	125.2
Volume of exported products, billion rubles.	37.1	31	46.9	58.9	61
Costs per one rubble of the sold product, cop.	89.4	95.8	86.0	83.3	84.2
EBT, billion rubles.	2.7	0.7	10.1	18.3	20.8
The number of production workers, thousand people.	18.0	16.5	16.3	16.4	16.7
Net profit, billion rubbles.	1.8	0.4	7.7	14.4	16.9

As we can see from the table 4, the net profit is increased from year to year. But at the same time we understand that the total amount of R&D is increased too. At first, we check up the hypothesis of the enterprise capital utilization and management efficiency within a cluster. In the given case the

observed value T at the calculated sample coefficient Rxy is subordinated to Student distribution with n-2 degrees of freedom at set level of α signification. In this case the relation between the absolute value of research and experimental development (R&D) at the enterprise and the absolute value of base profit in rubles turns out to be strong and positive, as shown in table 5,6.

TABLE 5.
DATA COLLECTION.

Period	2006	2007	2008	2009	2010	2011	2012
The net profit per share, rubble	1,99	0	1,09	0,26	4,8	8,93	10,51
The total amount of R&D, thousand rubbles	320	253	220	165	117261	193975	296009

TABLE 6.
THE RESULTS.

Xi	Yi	Rxy	n-2	T	α	t
86886,14	3,94	0,98	5	10,71	0,2	1,4

Xi – the total amount of R&D in thousand rubles in each period,
X - average of the sum of Xi in thousand ruble,
Yi - the net profit per share in rubles,
Y – average of the sum of Yi in rubles,
Rxy - the sample correlation coefficient,
T - the observed value,
n – quantity of the years.

Then we calculated the the weighted average cost of capital of the enterprise OJSC «Nizhnekamskneftekhim» at the period 2009-2012 on the based of annual reports, as shown in table 7.

The weighted average cost of capital of the enterprise OJSC «Nizhnekamskneftekhim» at the period 2009-2012.

TABLE 7.

Indicators	2009	2010	2011	2012
We	0.51	0.61	0.71	0.79
Wd	0.49	0.39	0.29	0.21
Ke	0.004	0.06	0.089	0.095
Kd	0.02	0.03	0.037	0.04
T	0.2	0.2	0.2	0.2
WACC	0.01	0.046	0.072	0.082

ç. CONCLUSIONS.

As we can see from the table 7, the weighted average cost of capital is low. Because the WACC is as high as 19.2 %, for offer equally plausible versions it as low as 5.3 %. And the typical firm uses about 25% debt finance and 75% equity finance. [13] Recent research in the field of cluster policy completely enough proved the theoretic significance of the given process in the development of regions. At a later stage it is necessary to form and implement systematization of measure groups for estimating cluster performance. It is the author's opinion that the system of economic performances reflecting the social-economical effect from interrelation of the enterprises-cluster participants in the process of cooperation and competitiveness must act as the basis of cluster activity assessment in post industrial economy. Combination of two contra-positive processes is possible due to the fact that they take place in different areas and between different participants. This is precisely why the assessment of social and economic consequences of cluster formation should be made according to the following indicator sets:

- indicators designating the structure of cluster forming and its economic activities;
- indicators reflecting efficiency of intellectual capital utilization within the frames of the cluster (in particular, synergetic effect of key areas of competence and intangible assets such as consumer-oriented assets, informational technologies, infrastructure assets, etc. joint use in the frames of the cluster);
- indicators taking into account the inner and outer institutional factors in the companies-cluster participants (e.g. the level of transaction expenses).

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