

# Analysis of the Weighted Average Cost of Working Capital of Selected Companies on the Bulgarian Stock Exchange During the Financial and Economic Crisis

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## Summary

The financial and economic crisis which started in 2007 made modern financial management turn to a vast and detailed approach to operational guidance of the business. Attention focused on working capital management and optimization of investment in current assets in the long term. Liquidity impediments and environmental shocks on sales and capital accessibility caused the need for putting more stress on working capital structure and the cost of financing along with profitability of short-term company investments.

The conception of weighted average cost of working capital (WACWC) is based on a long-term approach to short-term assets. The importance of this relatively new indicator reveals the efficiency of liabilities management in crisis and provides a good basis for decisions concerning operating profitability and turnover. The WACWC can also represent the compensation effects of the capital structure dynamics and interest rates influence in times of shortage of capital sources. This new index measures the internal ability of implicit financing sources and the risk of financing current business activities. It also covers some non-traditional capital options that ensued from the crisis like related parties' financing and sales or depreciation

funding, extended trade credit schemes, renewable overdrafts and credit lines, etc.

Analyzing data for selected Bulgarian companies during the crisis and post-crisis period (2007-2015) shows a constantly decreasing average cost of working capital financing. This resulted from a changing capital structure that is characterized by an increasing share of equity in the form of retained earnings and debts to related parties. The short-term effect of all other sources of financing continues till the WACWC is in balance with the regulated trading rate of return after normalization of the conditions for overdraft and owner's capital financing. WACWC shows very close values to classic long-term WACC which is compensated by poor results for the profitability on current assets (ROCA). The higher liquidity requirements led to a reasonable increase in current assets investments although their share to the net revenues remains relatively constant. The enhanced role of owner's capital has become a natural reaction to the external shocks caused by the crisis but also a remedy assuring flexibility, independent asset management and risk selection for implementing effective hedging policy in the corporation.

**Key words:** *weighted average cost of working capital, working capital management, financial and economic crisis.*

**JEL Classification:** G01, G32

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## 1. Introduction

In times of crisis like the one started in 2007 corporate management is usually forced to change direction. The overlook of working capital optimization due to the easy access and weak regulations before 2007 led to bad internal corporate practices and hasty short-term decisions. The traditional leading role of entrepreneurship and sales policy was quickly replaced by the principles of financial management and its expanding new functions. This tendency undoubtedly required new methods and conceptions that would perfectly identify both the specific impact of the crisis on corporate operations and the complex financial activities aimed at achieving the same maximization criteria but using a different approach. A good example for a basic indicator in times of crisis is the weighted average cost of working capital (WACWC). The use of WACWC will comprise at least four major aspects of the new corporate environment:

- The financial and economic crisis shocks through the interest rates and the cost of capital
- The reliance on internal, indirect or non-traditional sources of permanent financing characterized by particular conditions and costs of their availability and use.
- The minimum required rate of return that should be overcome by the return on current assets within the operation cycle of the company
- The influence of the cost of capital on liquidity assurance and the tough balance with the opposite impact on business profitability.

The main goal of the current article is to outline the necessity for considering new indicators that better represent the dynamics of the contemporary financial management functionality and the shocks of the crisis.

The reasons behind this study are rooted in the different structural approach to asset and liabilities management during economic slowdown and capital limitations.

## 2. Literature review

The issues of working capital financing costs are not vastly discussed in the available literature as the importance of working capital management has increased in the last decade because of the financial and economic crisis in the corporate sector. The approach to working capital as a cumulative capital structure of different sources is important to avoid stress only on current investments and their potential optimization. Moreover the sources of working capital are quite easily recognized but the problem of defining their specific cost of capital and trying to aggregate a long-term average cost is difficult.

Preve, et.al (2010) presented a detailed approach to working capital financing costs advising the use of a combination of capital sources like equity and long-term debt into the classic concept of WACC<sup>1</sup>. Both cost of debt and cost of equity are based on the risk-free rate plus a credit spread accounting for default risk or a market risk premium corrected with the individual market risk beta. Bolek (2014) proposes calculating the indicator ROCA using the after-tax operating income, weighted by the proportion of current assets to total current assets without securities. The indicator is seen in analogy with the return on working capital ROWC. The analysis recommended a comparison of ROCA with the weighted average cost of working capital (WCWACC) to conclude on indirect ability of current assets to generate earnings. The average cost of capital is calculated as the sum of the return on equity and short-term interest rates<sup>2</sup>.

<sup>1</sup> Preve, L., Allende, V., 2010. Working Capital Management, Oxford University Press, p.127

<sup>2</sup> Bolek, M., 2014. Return on current assets, working capital and required rate of return on equity, Financial Internet Quarterly "E-Finance", vol.10, nr.2, p.4.

MarketInvoice<sup>3</sup> clarifies the main sources of working capital financing including bank overdrafts, invoice discounting and factoring, advance incomes and advances from clients, installment loans, commercial papers, trade finance and letters of credit. As opposed to short-term approach long-term sources include equity capital and loans. Padachi, et.al (2012)<sup>4</sup> investigate a group of respondents who participated in the ranking on the use of finance for current needs. The results showed a clear preference to retained earnings to finance the business working capital requirements. Another important conclusion refers to the additional working capital needs that are available through shareholder's loans rather than debt capital. Pelberg (2015)<sup>5</sup> mentions that working capital costs are associated with the company's short debt position (mostly accounts payable and wages payable) and the current portion of long-term debt both accounted into the current liabilities section of the balance sheet. Andrews, et. al (1959) point out the natural need for financing permanent assets by continuously refunding short-term debt in case of lack of access to external long-term debt and equity sources<sup>6</sup>. Boitan (2016) generalized that in times of financial turmoil the banks are reluctant to provide new loans and the real sector suffers most while trying to maintain the going concern of their business<sup>7</sup>.

### 3. Essential aspects of the financial and economic crisis in Bulgaria

The main trends in the Bulgarian economy after 2007 are associated with four important aspects that affected the

functionality of the real sector. First of all the unfolding financial crisis transferred from the US banking sector and financial markets to the banks and investors in the European Union, disbanded the credit lines from parent banks from Western and Central Europe who own major subsidiary banking institutions in the country. This caused the need to look for resources from the domestic market by attracting deposits from companies and individuals at a relatively higher rate compared to the traditionally low interest rates in Europe. The rise of the cost of capital automatically caused an increase in interest rates on current and new credit exposures. The credit "bubble" of the increased share of "bad" loans deteriorated the financial condition and the profitability of the banks in Bulgaria. The result was additional risk aversion and tightening of the requirements for all investors and their projects. The reduced banking activity has had a direct impact on the management of cash flows.

The worsening financial situation for many medium and small entities was followed by a reduction in external demand (export), shrinking foreign investments and lending and obviously sinking sales that translated into a significant fall in GDP in 2009. Many companies were forced to declare bankruptcy because of the insufficient funding, which resulted in accumulation of considerable inter-company indebtedness. The financial system shocks imposed a series of restrictions transformed into lower economic growth and the dominant role

<sup>3</sup> MarketInvoice, Working capital and Business Finance Solutions, Article 1: Short-term Business Finance and Working Capital Solutions, [Online], Available: <https://www.marketinvoice.com/business-finance/what-is-working-capital-finance> [Accessed 4 March 2017]

<sup>4</sup> Padachi, K., Howorth, C., Narasimha, M., 2012. Working Capital Financing Preferences: The Case of Mauritian Manufacturing SME's, AAMJAF, Vol.8, No.1, 12, p.134

<sup>5</sup> Pelberg, D., 2015. What are working capital costs, Investopedia publication, [Online]. Available: <http://www.investopedia.com/ask/answers/102315/what-are-working-capital-costs.asp> [Accessed 4 March 2017]

<sup>6</sup> Andrews, V., Friedland, S., Shapiro, E., 1959. Working capital financing of Small Business, Law and Contemporary Problems Journal, Vol.24, No.1, p.68.

<sup>7</sup> Boitan, L., 2016 Crowdfunding and Financial Inclusion Evidence from EU Countries, Economic Alternatives Journal, Issue 4, p.430.

of bureaucracy and financial decisions in the strategic development and operational management at all levels of the economy. Administrative costs and regulations fully occupied free entrepreneurial spirit and the natural striving to increase sales and run higher risks.

Essentially, working capital management includes all major functional areas in the company and concerns as its main objective to achieve maximum results for the owners by balancing profitability, turnover and liquidity within the operational activity of the business. While individual entities in the structure of the company relate primarily to one or few aspects of the asset management, the financial management extends to focusing on the management of funding sources, their maturity, price, value, structure, collaterals, etc. This broad range of interventions is justified by the complexity of the objective for maximizing the wealth of shareholders and the change towards preserving stability after 2007. Many contemporary financial managers are too concentrated on control and monitoring of assets and not enough on solving the capital structure in terms of environmental limitations. Liabilities management is a key strategic and operational function of the modern financial management. The changes in capital structure and financial risk are known for being a serious tool for increasing the wealth of shareholders. The shocks on the stability of the company's liabilities may lead to destruction of the overall business activity and even bankruptcy.

#### 4. Data and Methodology

The basis of the analysis of the construction of WACWC and the effects of its enclosure on liquidity and profitability use data from the quarterly financial reports of 20 selected companies from different sectors of the Bulgarian economy included in the BGBX40 index of the Bulgarian Stock

Exchange for the period 2007-2015. The survey covered 20 companies constantly participating in the calculation of BGBX40 (BG40 to March 2014) for the analyzed period. All selected companies have also had the highest number of transactions and the highest median value of daily turnover during the last six months. The data for the interest rates changes and the cost of capital of different capital sources is extended to 2016.

The methodology of the study includes inductive approach to the formation and the structure of the WACWC in times of crisis, comparative analysis of the different interest rates and costs of financial sources and qualitative research on the relation between the cost of capital and the real dynamics of the short-term investment policy and liabilities' management.

#### 5. Conception and structure of the weighted average cost of working capital

The main pre-condition for the calculation of the average cost of working capital (WACWC) is the long-term characteristic of the capital sources. The long-term liabilities contain both owner's and borrowed capital and their function is to guarantee the liquidity of the company, while the remaining liabilities actually secure profitability. A key characteristic of the weighted average cost of working capital is the impact of the permanent current liabilities related to the financing of the current assets. Another key feature is the greater flexibility of the financing options and the variation in the potential average cost of capital. The reason behind this conclusion is related to the range of sources that can be used for short-term investments depending on the working capital management strategy and the assumed level of risk based on the profitability – liquidity balance.

The structure of the WACWC is influenced by the fact that the current assets cannot be directly financed by long-term sources like stock and bond issues or investment loans and financial leasing. This means that the specification of the long-term financing options should be different compared to the regular WACC applied to the entire liabilities. In summary, the conception of weighted average cost of working capital during crisis can be represented as follows:

$$\text{WACWC} = \text{Equity ratio by direct and indirect sources} * \text{Cost of capital of Equity} + \text{Constant current liabilities ratio} * \text{Cost of capital of permanent current liabilities} \quad (1)$$

The calculation for the annual WACWC is based on the shares of each single source of

mutual and pension funds and insurance companies. The permanent current liabilities are usually formed by renewing overdrafts, extended trade credit from suppliers, overdues on repeating state and municipal bonds, deferred remuneration to the staff, etc. This model allows all assets to be managed in a flexible and independent manner following the main goal for utilization of any objective possibility for increasing sales and profitability in the post-crisis poor economic activity world. A more detailed view on the sources of working capital may consider financing from retained earnings, related parties' liabilities, internal holding sales of production, raw materials, goods and machinery, short-term depreciation funding, or dividend liabilities.

Table 1. Compatibility of traditional and working capital sources of financing during crisis

Traditional sources of capital	Sources of working capital (during crisis)
Public issue of common and preferred stock	Retained earnings
Retained earnings	
Debts to related parties	Debts to related parties and indirect sale or purchase of assets and services
Depreciation funds	Depreciation funds
Bank loans and financial leasing schemes	Short-term renewable bank loans
Public issue of long-term and short-term debt securities	Renewable short-term debt securities
Permanent short-term assets – materials and production, cash, client receivables	Constant short-term liabilities from suppliers payables, salaries, taxes, dividends

Source: Authors' point of view

working capital starting with the permanent current liabilities and the long-term debt if applicable. Hence the remaining part of the current assets is financed by retained earnings or related parties' sources (owners' capital). The combination of unconventional sources of equity and the constant minimum level of short-term liabilities can assure avoiding risks that result from the nature of the classic sources of financing like venture capitalists, banks and leasing companies,

Defining the cost of capital of all direct and indirect sources of financing is important for outlining the role of the WACWC for the optimization of the current assets' management during crisis. The optional sources mentioned above require a specific approach to identify their individual cost of availability to address the needs of the operational cycle of the business. The diversity of sources is important due to the ineffective role of the traditional sources

of capital. It allows businesses to survive following balanced or restrictive strategies of working capital management in long-term and lower WACWC. The main subject of this approach to liabilities is to allow the company to go through the crisis by offsetting the negative effects of the instability of the economy through supporting new investment opportunities ensuring better financial condition. Another problem regarding these strategies is related to the higher cost of funding, which is determined by the use of relatively expensive or purposive sources like equity, trade credit, credit from tax and salary overdues, depreciation funds, etc.

The cost of equity is one of the most discussed topics in corporate finance theory. Regarding working capital it is not acceptable to finance short-term investments through direct issues of stock which means that only retained earnings might be used to guarantee part of the fixed investment in current assets. Traditionally the cost of equity is calculated using modified approaches based on the Gordon model or the Capital Asset Pricing Model.

The most common type of working capital financing comes from short-term bank loans as the higher efficiency, the regulations and diversification guarantees a relatively low cost of capital and flexibility of use.

In times of crisis managers and owners are usually trying to optimize wealth at the holding company level, focusing on taxes, financial results, investment policies and capital structure. The additional sources of financing might include related parties' short- and long-term loans, sale or purchase of fixed and current assets, depreciation funds. All these options essentially represent an indirect use of owner's capital that allows more flexibility for the management because of the quick access to capital funds and the need for buffers against liquidity or structural incompatibility of the short-term assets.

The cost of financing current assets from permanent short-term liabilities depends on the various sources that might be considered as constant working capital. The revolving short-term loans can normally be in the form of credit lines or overdrafts that provide freedom of use of capital at a relatively low cost and accessible collateral. The effective cost of capital is usually corrected in terms of the taxation interpretation of interest costs. In addition to the basic interest rate are added the current bank fees for evaluation, approval and management of the credit limits, forming the annual percentage cost rate for the loan. The implicit opportunity cost behind this important source of capital results from the limitations to asset management.

The cost of financing through long-term trade credit agreements depends on the ability of the supplier to calculate the impact of the established market trading interest rate, the credit risk and the hedging costs. Traditionally this value depends on the discounts offered to the client for early payment. The trade credit cost of financing incorporates at least two main components. One is the interest rate applied by the supplier for the period of deferred payment which is usually higher than the interest rate applied by the banks or the financial markets. The opportunity cost for skipping the early payment discount also has to be calculated. These effects are summarized in the following model:

$$r = \left( 1 + \frac{\text{Discount}}{\text{Price} - \text{Discount}} \right)^{360/(n-m)} - 1 \quad (2)$$

Whereas  $n$  – agreed payment term (in days),  
 $m$  – discount maturity

In the real economy the most commonly offered discount for payment in advance is 2%. Despite the accepted traditional payment terms of 30 days, they are often extended up to 90 or 120 days in Central and Eastern Europe. The most common

Table 2. Cost of trade credit according to terms of sale (% discount and payment term in days)

Discount	30 days	45 days	60 days	90 days	120 days	150 days	180 days	360 days
1%	12,82%	8,37%	6,22%	4,10%	3,06%	2,44%	2,03%	1,01%
2%	27,43%	17,54%	12,89%	8,42%	6,25%	4,97%	4,12%	2,04%
3%	44,12%	27,59%	20,05%	12,96%	9,57%	7,58%	6,28%	3,09%
4%	63,21%	38,62%	27,75%	17,74%	13,03%	10,29%	8,51%	4,17%
5%	85,06%	50,73%	36,04%	22,77%	16,64%	13,10%	10,80%	5,26%

Source: Authors' calculations

period of 90 days corresponds to the cost of financing of 8.42% per annum, which might be fully comparable with the interest rates on investment loans in times of crisis. This mean period is also confirmed for the analyzed period 2007-2015 for the whole base of selected companies listed on the Bulgarian Stock Exchange.

The cost of funding current assets by delaying payments to the state or the personnel is similar to the usual interest on trade relations under the relative legislation and regulations. These options are usually applicable only in a very short term although a properly set framework may guarantee constant availability of liabilities maintained up to the amount of the average remuneration budget. Regarding the deferred state and municipality overdues there is always a hidden cost to be considered because of the risk of imposing additional fines by the revenue authorities. Longer payment terms for labor costs might lower productivity and quality of production. The retention of the wages normally has no certain cost and is probably the only free source in the liabilities column of the balance sheet of the company.

The cost of financing from related parties depends on the negotiated rate and terms when it comes to a direct loan. Holding companies' liabilities can often be considered long-term loans. They are mainly in the form of consulting agreements or resale of assets, goods and materials at different market price than their book value.

Related parties can also provide inventories or machinery with big discounts or long terms of payment but all these options express the interests of equity shareholders who then will apply a higher cost of funding depending on the risk taken. The main advantages of these options are the relatively quick access to capital without any procedures, requirements and collaterals. The cost of financing from related parties can generally be defined as the loss of dividend yield compared to the periods before using this additional capital and the actual costs resulting from the completed deals. Based on the regulations of related parties' transactions many of them are checked for applying market-based approach to their internal transactions and costs.

An interesting topic to be mentioned is the option to use depreciation funds for working capital financing. The depreciation fund is normally collected to ensure maximum level of retrieval of the invested capital in fixed assets. Although this process is not directly related to the current assets, it might have impact on the revenues and the business activity and the disposability of funds to be redirected to short-term financing. Considering the depreciation fund a source of financing means to presume uneven return on the existing long-term capital resources. In essence this is a reallocation process through additional deferment of reimbursement of the principal. Finally the depreciation funding is a form of indirect access to the classic sources of capital like stock and bond issues, long-

term debt, financial leasing, etc. The cost of capital then can be based on the source of capital that was temporarily reinvested. Regarding the WACWC depreciation could hardly be considered a long-term financing option having in mind that the retrieval of the invested long-term capital in present value is only partial. As banks usually require faster principal repayment compared to the objective depreciation, the remaining alternatives could be the use of owner's capital or any other type of securities' financing. Additional uncertainty arises from the possible future costs for repairs of long-term tangible assets as the main function of the depreciation model.

The question of calculating the average cost for all sources that form the working capital of the company is not a single matter to be solved since this cost must simultaneously meet the requirements for a minimum rate of return from the current assets (ROCA) of the company and still be consistent with the overall goals for optimization and the required term structure of liabilities. According to Ivan Kostov (2013)<sup>8</sup> the permanent part of the current liabilities has the nature of a long-term liability similarly to the minimum availability of the constant current assets. These debts are usually considered natural liabilities - for example some industrial companies often cover the labor costs a month after the period of real use of the labor and accounting of the cost. Thus the salary fund for two consecutive reported periods is a short-term liability that is restored after accrual of the following wages and creates an additional source of capital in the long term. Some income taxes and social security payments are calculated in parallel with salaries, but are due within a month and during that time they form a liability that is relatively stable and maintained on a monthly basis.

Outlining the permanent liabilities is important to solve correctly the "long-term" nature of the weighted-average cost of capital and remove the influence of the inconsistent spontaneous current liabilities in the short term. Obviously the calculation will include the renewable bank loans or credit lines, suppliers' trade credit liabilities, direct and indirect liabilities to related parties and deferred wages and salaries.

## 6. Capital structure and the interest rates – a benchmark for the WACWC

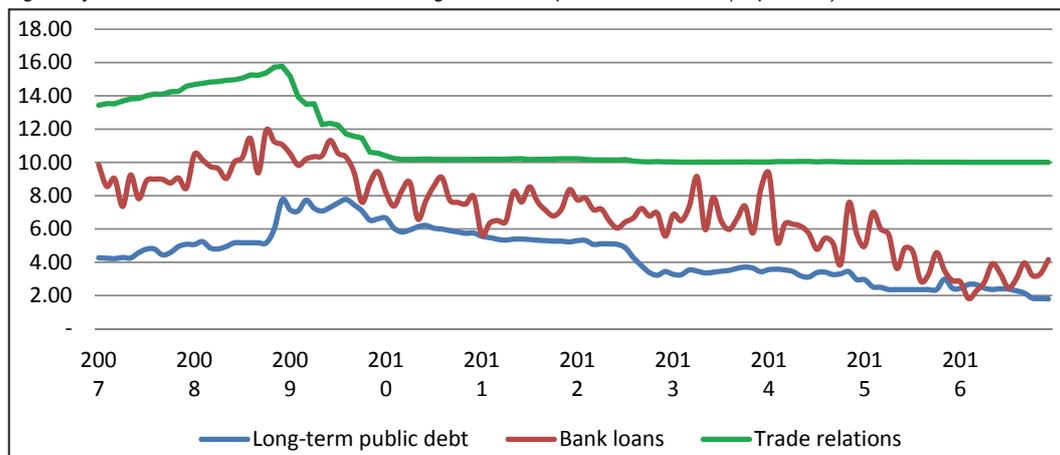
The study of the weighted average cost of working capital during crisis requires close analysis of the different interest rates that explain a significant part of the cost of capital for the different sources in the company. Particular stress is put on regulated interest rates, the role of the cost of public debts, the cost of equity and the banking rates for new loans. The basic interest rate in Bulgaria has always been the primary rate for legislation or other underlying purposes although it can only represent the major changes in the economy but underrate specific tendencies and processes. The fundamental "commercial" interest rate is defined in the Obligations and Contracts Act and all trading relations and state bearings are usually derived from this particular regulation. It adds 10 percentage points to the basic interest rate to form a fair estimation of the cost of capital that shows the adequate level of risk included in the commercial business activities. Of course this natural flatness of the indicator can't illustrate the real sensitivity of the economy and the operational aspect of the business during crisis. Based on the WACWC conception the commercial interest rate measures the cost of capital through

<sup>8</sup> Kostov, I., 2013. Financial Risk and Financial Position, Textbook for Distance Learning, Publishing Complex - UNWE, p.37 (in Bulgarian)

deferral of suppliers, government tax and social security liabilities. Another important indicator is the long-term interest rate on public debt securities. As the state is a key active participant on the financial markets, the behavior of the risk-free rate can give a good view on the economy's turns and obstacles that represent a key element of the cost of capital calculations for all kinds of financial sources for the companies. The long-term interest rate for convergence purposes is a European Central Bank indicator that represents the annual yield-to-maturity of the long-term government bonds in BGN on the secondary market. The interest rates on bank loans consider the cost of capital for medium-term outstanding credits in BGN (1 to 5 years) to be different from overdrafts and referred to non-financial (business) institutions. These statistics give a better view of the reliability of the financing decisions in crisis times<sup>9</sup>.

of bank loans because of the close relation to the unstable real economy during the crisis and the existing specific problems of the banking sector. On the other hand after 2010 the trading interest rate stabilized due to the zero values of the basic interest rate. This means that some of the financing options for the business operations have become essentially regulated and constant in values. This fact will somehow inflate the cost of use of working capital in times of low interest rates. Since 2009 both bank loans costs and the interest rates on public securities have shown gradual decrease and approximate equalization in 2016 at a lower rate compared to the pre-crisis period. Another interesting view is that the cost of the government debt almost doubled at the end of 2008 due to the crisis and then decreased by 4 times in the post-crisis period. Despite the higher volatility of the bank rates their dynamics was mostly a short-term reaction to the uncertainty and

Fig. 1. Dynamics of basic interest rates in Bulgaria for the period 2007-2016 (in percent)



Source: Authors' calculations, Bulgarian National Bank

The figure shows that the financial shocks of the crisis increased the required basic rates of return in Bulgaria. The greatest volatility was observed for the long-term cost

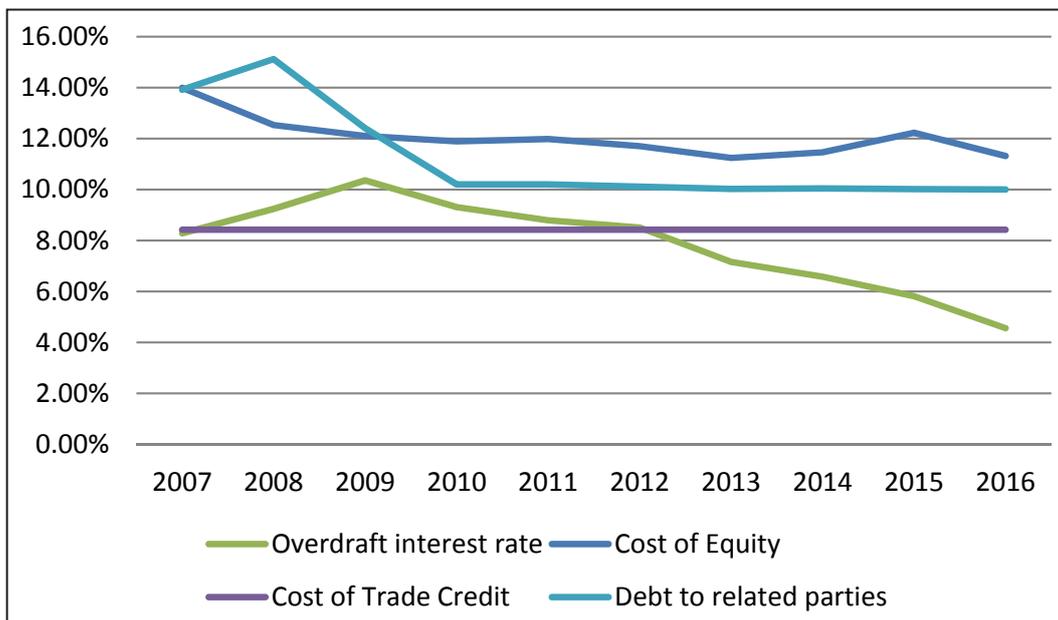
in the long term their range of fluctuation is lower. This means that the real sector was able to guarantee smoother operation relying mostly on internal equity financing.

<sup>9</sup> <http://www.bnb.bg/Statistics/StMonetaryInterestRate/StInterestRate/StIRInterestRate/index.htm> [Accessed 4 March 2017]

Closely related to the basic interest rates are the costs of the different capital sources that influence the WACWC. These particular rates are less sensitive to changes in the macroeconomic situation because they absorb tendencies indirectly through the behavior and the financial state of the industries. The role of the cost of equity is quite important in terms of the net working capital financing provided for the fixed current assets. Traditionally the cost of equity is higher because of the risk that investors entered into as a strategy for their wealth growth. This long term capital is a flexible option for financing the ever changing current assets because decisions are short term to assure adequate reaction and quickly grab all new business opportunities. An implicit use of owner's capital is noticed within the related parties' receivables and

payables or the use of depreciation funds. In terms of the crisis that started in 2007 the role of the equity financing increased due to the difficult access to other alternative forms like typical bank loans and bond securities. Changes were observed also in the dynamics of cost of equity calculated by Damodaran for the US economy<sup>10</sup> adding 3.17% risk premium for specification of the Bulgarian economy investment risk. Normally the cost of equity is provided via the Capital Asset Pricing Model (CAPM) with some modifications of beta and the market risk premium. The cost of trade credit is usually relatively high based on the legislation regulations for 30 days payment terms (13% to 27%) and acceptable discounts for early payment of 1-2%. In times of crisis in Bulgaria the usual average payment terms reached 90 days at 2% regular discount.

Fig. 2. Dynamics of the basic costs of capital for selected Bulgarian companies included in the BXBG40 index of Bulgarian Stock Exchange for the period 2007-2016 (in percent)



Source: Authors' calculations, Bulgarian National Bank  
<http://pages.stern.nyu.edu/~adamodar/> [Accessed 4 March 2017]

<sup>10</sup> <http://pages.stern.nyu.edu/~adamodar/> [Accessed 4 March 2017]

This represents cost of capital of about 8.42% annually. Debts to related parties should be in line with the trading conditions in the economy represented by the regulated trade interest rate. Essentially this capital is actually owned by the shareholders in the company. Another important rate in terms of the working capital financing is the cost of using short-term negotiable overdrafts that are normally prolonged for a few years and aimed at financing operation activities of the corporate entities. The comparison of these basic costs of working capital financing is presented on the following figure.

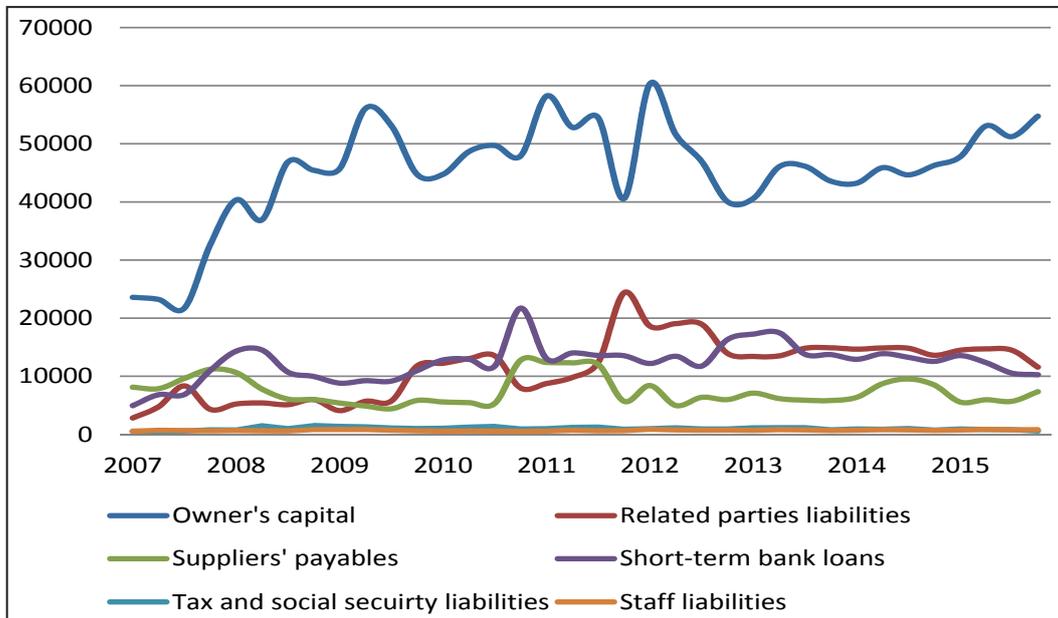
At the peak of the crisis, between 2008 and 2010, the cost of financing for typical overdraft loans increased significantly and almost reached the required average rate of return on equity. Assuming that before the crisis the most important capital source for the business came from foreign investment, we can argue that in 2009 the cost of equity (excluding the country risk premium) was even lower than the alternative interest rates due to the temporal direct or indirect use of owner's capital for short-term investment needs. After the stabilization of the financial system and the economy the costs of equity and debt returned to their normal balance increasing the opportunities to gain positive effects from the capital structure. Figure 2 shows that up to 2012 trade credit was the the most advantageous form of financing of the current assets, although this might cause additional default risk, operating and sales risk. Later the short-term bank loans returned to their standard position as the most lucrative source of funding while keeping some restrictions for the lending volumes and access to financing. The real cost of equity is traditionally the most expensive source of capital but it also showed values close to the regulated trading interest rate associated with the related parties' debt. The cost of equity showed relatively stable tendency of decrease for the analyzed

period without considerable variations or reactions to the crisis changes in the economy. This fact confirms that owner's capital is a proper source of financing during uncertain times and to some degree it may be provided at a comparable cost with other more popular options for working capital provision. Including its native flexibility and control together with the opportunity to easily manage the long-term and short-term assets, this cost is found very effective.

An important step in this study refers not only to the cost of the different financing options but also to the way the capital is used and the structure of the working capital during crisis. On Figure 3 there is a clear growth in arranged owner's capital despite the theoretical assumption for its higher cost. The other typical short-term sources had less impact on the current assets' financing except for the slightly increasing role of related parties' financing and short-term bank loans. Especially surprising conclusion concerns the lack of considerable change in suppliers' liabilities although this process might be different for small and medium sized entities. The figure shows that a higher variability and increase of WACWC might be expected during the crisis after 2007. The main reasons behind this include the increased financing from retained earnings and the use of expensive and irregular options like extended trade credit conditions and holding company loans.

Based on the analysis of the single cost of financing for all main sources of working capital and the changing structure of financing it is possible to calculate the weighted average cost of working capital yearly using the moving average minimum quarterly values for selected Bulgarian companies from the index BGBX40 and to study its behavior during the financial and economic crisis since 2007 and the influence on the structure of financing. The calculation requires modification of

Fig. 3: Structure and changes in basic working capital financing sources for selected Bulgarian companies included in the BXBG40 index of Bulgarian Stock Exchange for the period 2007-2015 (in thousands BGN)



Source: Authors' calculations and 3-month financial statements of the selected entities

the average value of all types of liabilities through a moving minimum function that defines the permanent availability of each source of short-term financing. The long-term net working capital is mostly guaranteed by the owner's capital which is calculated annually as a moving average. The same approach is applied to the total investment in current assets and the real current liabilities including their uncertain fluctuations. The single mark of debt financing reveals the functionality of the typical short-term overdrafts as a long-term debt in support of equity working capital coverage. The formula below presents the calculation:

$$WACWC = \frac{E}{E + D + FCL} \times CC_E + \frac{D}{E + D + FCL} \times CC_D + \frac{FCL}{E + D + FCL} \times CC_{FCL} \quad (3)$$

$CC_E$  (Cost of capital of Equity),  $CC_D$  (Cost of capital of Debt),  $CC_{FCL}$  (Cost of capital of Fixed current liabilities), E (Equity), D (Debt), FCL (Fixed Current Liabilities)

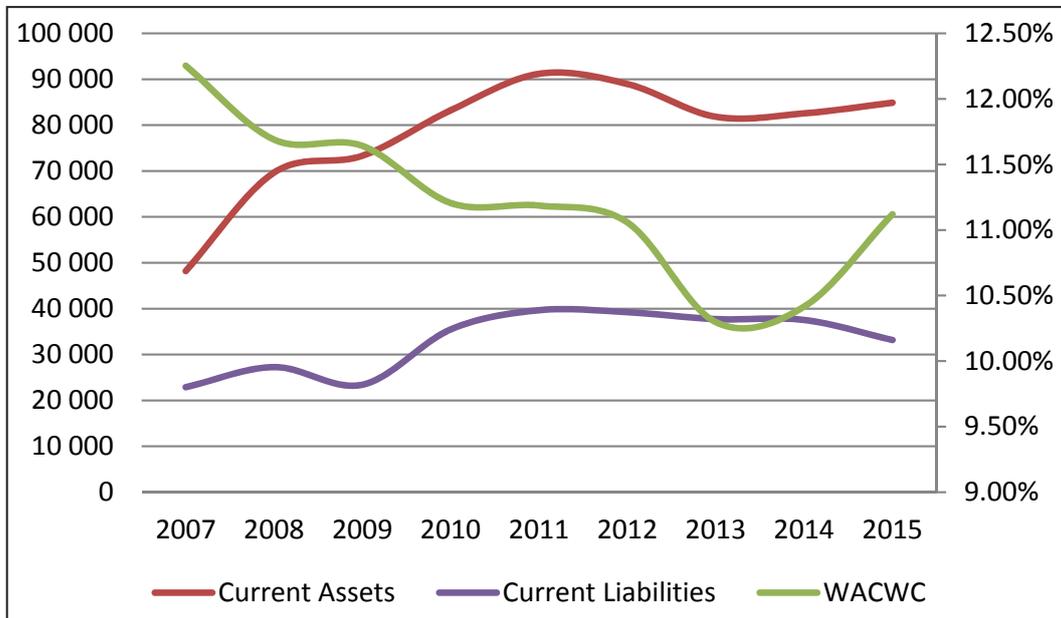
Figure 4: Current assets and Current liabilities (left axis in thousands BGN) and WACWC (right axes in percent) for selected Bulgarian companies included in the BXBG40 index of Bulgarian Stock Exchange for the period 2007-2015

Source: Authors' calculations and 3-month financial statements of selected entities

Figure 4 shows that the WACWC decreased even in the most severe 2007 – 2010 crisis period. The constantly decreasing average cost of capital resulted from the ability of the financial management to compensate the lack of financing from

the banking sector and the financial markets by owner's capital (or similar to owner's capital) smoothing its traditionally higher cost through short-term use of suppliers'

Fig. 4. Current assets and Current liabilities (left axis in thousands BGN) and WACWC (right axes in percent) for selected Bulgarian companies included in the BXBG40 index of Bulgarian Stock Exchange for the period 2007-2015



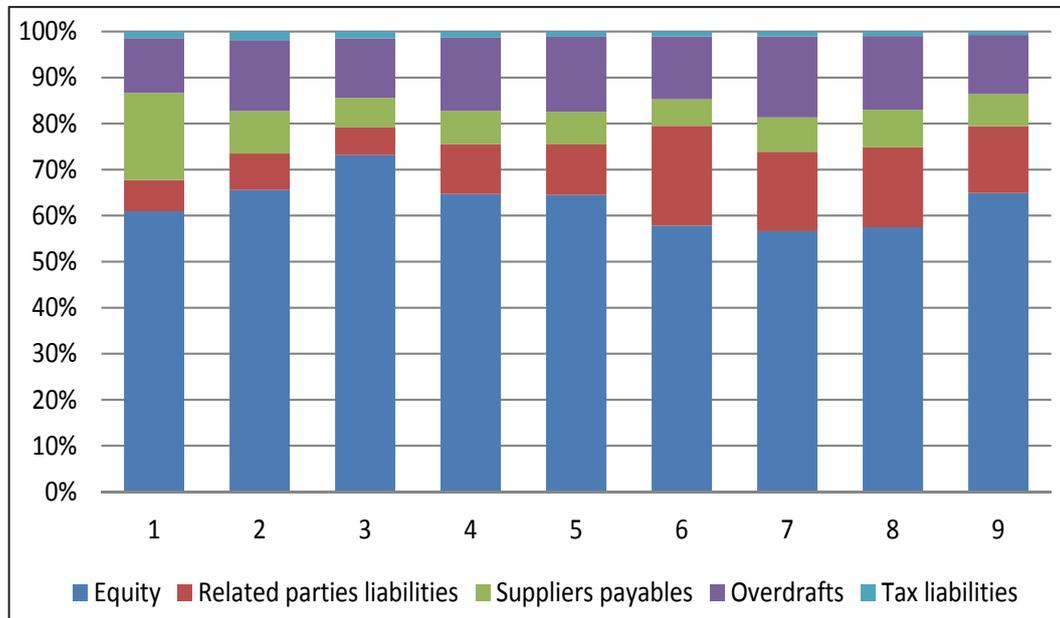
Source: Authors' calculations and 3-month financial statements of selected entities

liabilities prolongation. The other important effect resulted from the decreasing cost of equity. For seven years the WACWC fell by 16% from over 12% to less than 10.30%. These numbers also reflected the changing structure of the long-term working capital (Figure 5). The decrease in WACWC means that the crisis provoked a better operational management directed at the absorption of the environment shocks by emphasizing the internal effectiveness and risk control. Following the constant decrease of the average cost of financing the financial managers were able to increase the availability of current assets in terms of solving their most important short-term task to cope with the increasing liquidity problems due to the crisis. Another important conclusion relates to the increase of the current assets and the positive net working capital. The higher short-term investment resulted mainly from hedging decisions focused on liquidity risk priorities.

This process was supported by decreasing average cost of financing and low alternative cost for keeping higher medial availability of current assets. The increasing value of the short-term liabilities outlines the liquidity absorption impact of financial management's policy to match cash flows through directing capital sources instead of optimizing the uncontrollable current investment options.

The capital structure after 2007 demonstrated the increasing role of the owner's capital formed by retained earnings, reserves and direct or indirect related parties' liabilities. The decreasing share of trade credit capital shows that it has short-term significance for the liquidity management but cannot guarantee a long-term stability of the short-term assets. The capital structure of the companies considered during the crisis was dominated by 86% equity financing on average and the remaining 14% were liabilities to the banking sector, leasing companies, bond investors, etc. On

Fig. 5. Structure of the working capital financing for selected Bulgarian companies included in the BXBG40 index of the Bulgarian Stock Exchange for the period 2007-2015 (in percent)



Source: Authors' calculations and 3-month financial statements of selected entities

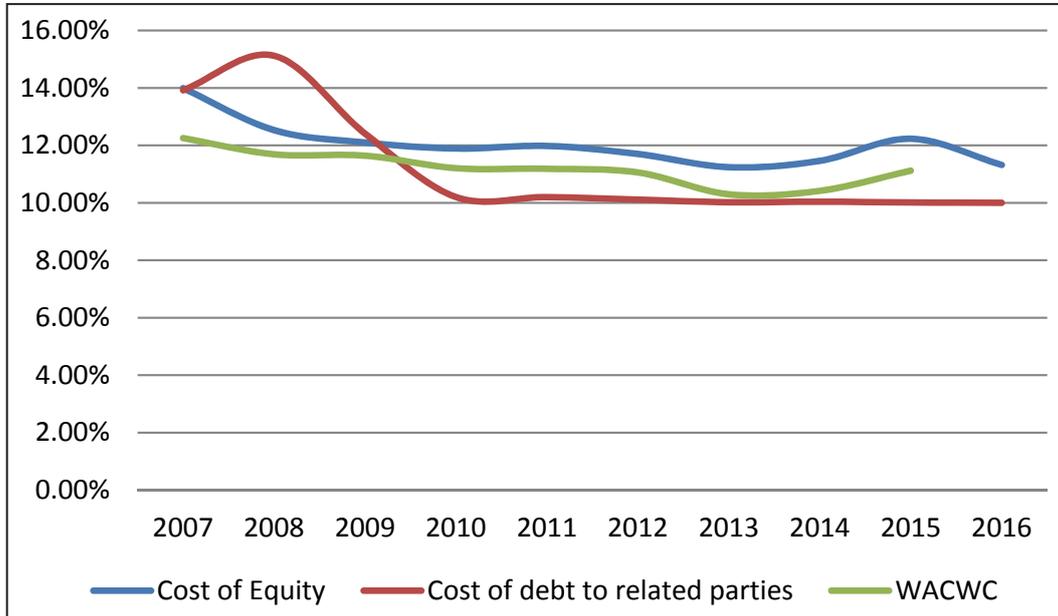
the other hand, the structure of the working capital shows less but increasing share of owner's capital – 75.44%. This means that comparing the regular WACC with the WACWC needs to account for the different weight and incompatibility of the included sources of capital. The data analysis also demonstrates the higher volatility of the capital structure of the working capital.

The prolongation of the trade credit liabilities after the agreed term may generate additional financing for the operation of the company. The usual reason for the policy of overdues comes from the lack of sufficient long-term financing, the growing value of receivables due to clients' payment delays or because of the negative financial results for a certain period of time. The additional delays will also decrease the average annual cost of trade credit financing from 8.42% to 6.25% or even less decreasing the WACWC or at least serving as an instrument for compensation of other expensive working

capital sources. Essentially the trade credit financing is easily accessible but can also impact trade relations in case of deviation from the agreed policy and functionality of the business.

An important conclusion refers to the stabilization of the WACWC for the Bulgarian public companies close to the value of the commercial rate, which shows that after 2010 the funding sources costs in the economy were in equilibrium with the opportunity cost of capital that directly influences the availability of assets. The data analysis demonstrates the opposite relationship between the two variables except for the period around 2012 and after 2015. In the early years of the crisis liquidity became a priority of the corporate management despite the higher costs of capital. This was caused due to the scarce revenues and the over-regulation trend in modern financial management. It might be generalized that the weighted average cost is heavily influenced

Fig. 6. Similarity of cost of equity, WACWC and the regulated interest rate (in percent)



Source: Authors' calculations, Bulgarian National Bank and 3-month financial statements of selected entities, <http://pages.stern.nyu.edu/~adamodar/>

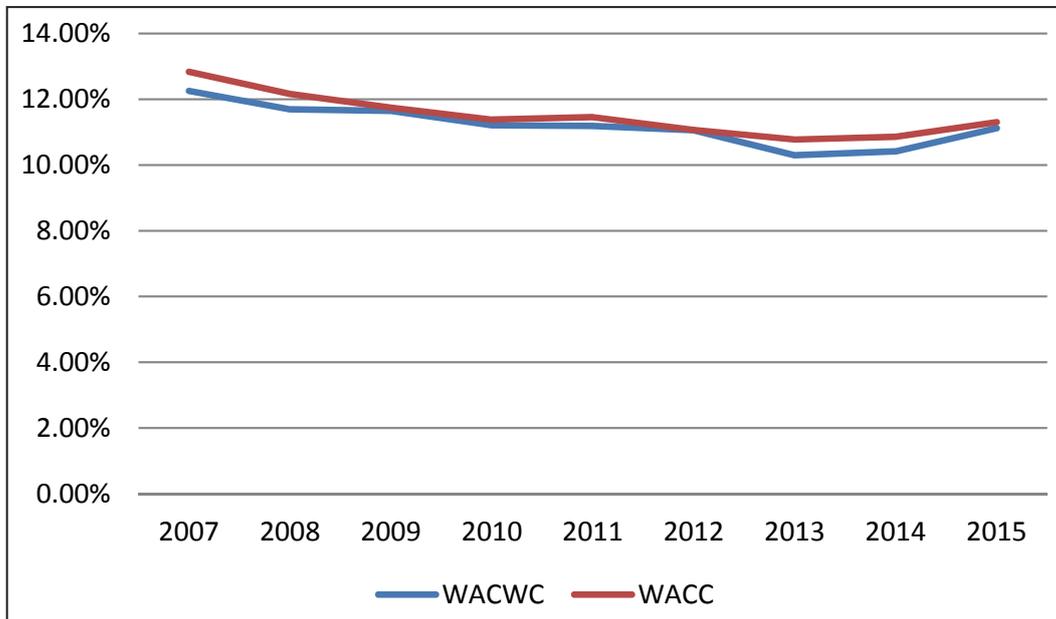
by the general macroeconomic trends in the banking sector and the changing patterns of the real business financing. The overall dominant role of equity determined the relatively high values of the average cost of capital, despite the decline after 2009.

The dynamics of WACWC shows an interesting similarity for both cost of equity and related parties' financing cost. This proves the major role of the owner's capital for surviving the crisis but also the weak impact of all other sources in the long-term period. Another key point is the levelling of the regulated interest rate, the cost of related parties' debt and WACWC. It is a clear sign of the normalization of the cost of capital of traditional equity and debt sources (overdrafts) and the complimentary regulative role of all other short-term liabilities. The comparison between the weighted average cost of capital and cost of trade credit in the period 2013-2015 shows that both costs are almost equal. This

means that supplier's financing still shows a high degree of efficiency as an alternative to the banks, but usually it is associated with easier access and terms of use. The current investments that were financed by trade credit liabilities can be used effectively without major limitations.

Finally the comparison of the classic long-term WACC and the WACWC for the selected public companies demonstrates a very similar reaction of both indicators to the crisis and the same cost of financing for the short and long-term investments. This effect resulted mostly from the high share of equity and the compensation for the different capital structures by the cost of direct and indirect long-term and permanent short-term liabilities. Moreover, the requirements for the return on current assets should be exceptional because of having the same cost of capital but there is need to restore only the operational capital. On the other hand the equilibrium between

Fig. 7. Comparison of WACC and WACWC for selected Bulgarian companies for the period 2007-2015 (in percent)



Source: Authors' calculations, Bulgarian National Bank and three-month financial statements of entities, <http://pages.stern.nyu.edu/~adamodar/>

both rates means that in times of crisis the higher liquidity requirements are usually pursued by higher financing outlays and a higher level of risk than the risk of the whole asset investment. The results then damaged profitability substantially showing the ineffective management of the liquidity-profitability ratio and the poor effect of the increased control and regulations by the financial management.

The resulting value from analyzing the profitability of the assets is the operating profit (EBIT) since it is associated with the outcome of the core activity and use of company's assets. Likewise the return on equity (ROE) is analyzed in relation to the net earnings concerning the shareholders. Regarding the return on current assets (ROCA), the value of the final output is a result of their effective turnover within the operational cycle and at the same time the ability to recover the capital invested in the fixed assets through depreciation.

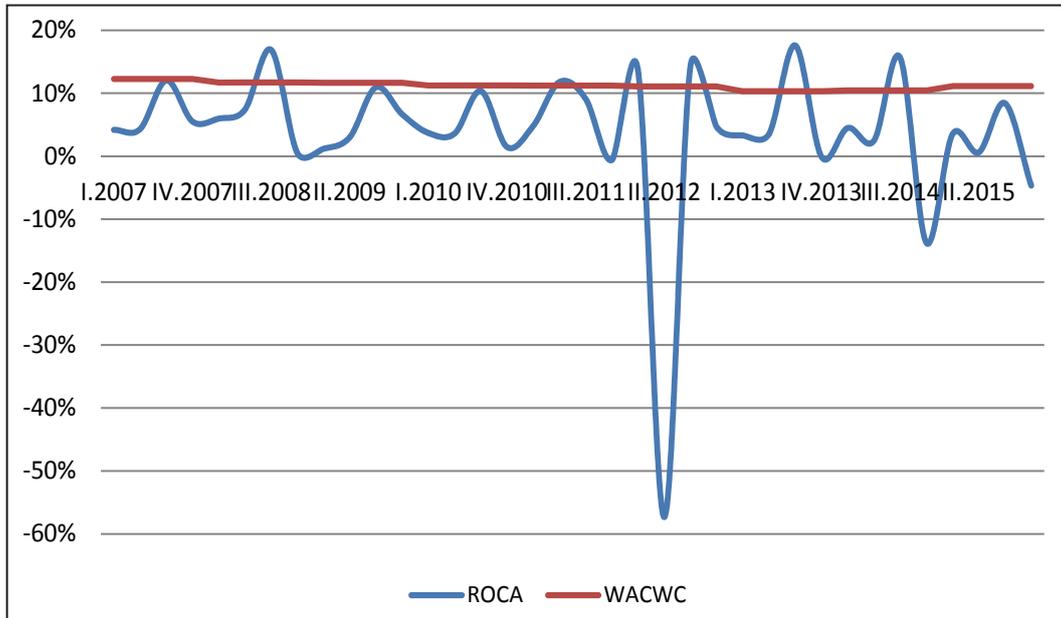
Eliminating the effect of the fixed assets utilization determines that the result of the current assets transformation might be represented by the indicator for the earnings before interest, taxes, depreciation and amortization (EBITDA), which is a measure of the actual cash gross profitability from the use of the current assets. The recommended indicator for the analysis (ROCA) has the following expression:

$$ROCA = \frac{EBITDA}{CURRENT\ ASSETS} \quad (4)$$

Whereas ROCA – return on current assets, EBITDA – earnings before interest, taxes, depreciation and amortization, CURRENT ASSETS – average availability for the period

The comparison between the WACWC and the profitability indicator shows the negative outcome of the financial policy of controlling the liquidity-profitability balance. For the whole crisis period the variability of

Fig. 8. Return on current assets (ROCA) and Weighted Average Cost of Working Capital (WACWC) for selected Bulgarian companies included in the BXBG40 index of Bulgarian Stock Exchange for the period 2007-2015 (in percent) period 2007-2015 (in percent)



Source: Authors' calculations, Bulgarian National Bank and 3-month financial statements of selected entities, <http://pages.stern.nyu.edu/~adamodar/>

profitability is high with slight decrease and even negative in 2014. The other conclusion is that due to the expensive working capital financing and decreasing sales, the poor profitability cannot even cover the cost of financing. Thus the main task of the financial management in times of crisis to maintain profitability despite the growing liquidity problems is not fulfilled effectively. In the meantime the functionality and the level of control of the financial management have increased substantially.

### Conclusion

The 2007 crisis increased the importance of the operational financial management and directed its attention to closer management of the sources of current assets' financing due to existing liquidity impediments and tough access to outside capital. The growing significance of the liabilities and the capital

structure influenced the need to consider the role of the weighted average cost of working capital (WACWC) in terms of evaluating the effectiveness of the current business and the financial decisions aimed at supporting profitability, sales and liquidity at the same time. The cost of working capital includes mostly equity as retained earnings and related parties' capital, but also permanent short-term liabilities to suppliers, staff, tax authorities and banks.

In Bulgaria the WACWC showed a stable decrease for the period 2007-2015 leading to loose liquidity management, higher levels of current assets investment and increased impact of the owner's working capital. Thus WACWC demonstrated very similar values and volatility to the cost of equity, the established trade interest rate and the regular WACC especially in the post-crisis period. The impact of the equity financing on

WACWC is unstable but varies within a narrow range showing a slight increase despite the diminishing cost of equity. Regarding the overdraft and the trade credit financing, their influence decreases during the crisis and the post-crisis period demonstrating the compensation effect between both sources due to their use as alternatives based on the problem with capital access. During the analyzed period the indicator for WACWC kept high values that exceeded the return on current assets (ROCA) for most of the time. This unsatisfactory profitability points to the necessity of giving a new direction to the contemporary financial management for a more balanced approach to the liquidity risk and the use of internal sources for future growth and effectiveness. The greater role of the owner's capital financing kept the WACWC too high not allowing financial risk to generate additional effects on the financial performance and shareholders' wealth.

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### Appendix

List of selected companies from BGBX40 (BG40) on the Bulgarian Stock Exchange for the period 2007-2015

- Albena AD
- Alkomet AD - Shumen
- Biovet AD - Peshtera
- Bulgartabac-holding AD, Sofia
- Elhim Iskra AD - Pazardjik
- EMKA AD - Sevlievo
- Zarneni Hrani Bulgaria AD - Sofia
- Industrialen Kapital Holding AD - Sofia
- M+C Hidravlik AD - Kazanlak
- Monbat AD - Sofia
- Neochim AD - Dimitrovgrad
- Petrol AD - Sofia
- Prouchvane I dobiv na neft i gaz AD Sofia
- Sviloza AD - Svishtov
- Sinergon Holding AD - Sofia
- Sopharma AD - Sofia
- Stara Planina Hold AD - Sofia
- Himimport AD - Sofia
- Holding Varna AD - Varna
- Yuri Gagarin AD - Plovdiv