ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 32(7), 2023

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DCF VALUATION: THE INTERRELATION BETWEEN THE DYNAMICS OF OPERATING REVENUE AND GROSS INVESTMENTS[3]

The current research paper explores some key aspects of the application of the DCF enterprise valuation. This paper presents the second part of a broader study by the authors, which is focused on the analysis of key input variables, predetermining the amount of free operating cash flows as an important part of the application of DCF valuation models. Here are the most serious prerequisites for deviation of forecasts from reality, which often leads to a significant distortion of the final valuations of enterprises. This provokes the research on the interdependence between the five main input variables and especially between operating revenue on the one hand, and the different expenditure groups, on the other hand, is required. In the first part of this research, the relationship between operating revenue and operating expenditures was investigated. In the present research paper, the relationship between operating revenue and gross investment expenditures is investigated, including the increase in net operating working capital and capital expenditures. The research was again carried out on the basis of aggregated data for all non-financial enterprises in Bulgaria for the period 2008-2020. The results are generally ambiguous, but in the medium and long term, at least for some of the largest sectors explored, relatively representative and sustainable averages are established for the relative share of net operating working capital and capital expenditures to revenues. There are no strong arguments against forecasting gross investment costs based on their historical averages as a percentage of operating revenue.

Keywords: company valuation; DCF enterprise valuation model; net operating working capital; capital expenditures; operating free cash flows
JEL: G30; G32

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[3] *The publication contains the results of a study funded by a targeted subsidy of the University of National and World Economy, Contract No: NID NI-2 / 2020, led by prof. Dimiter Nenkov.*
This paper should be cited as: *Nenkov, D., Hristozov, Y. (2023). DCF Valuation: The Interrelation between the Dynamics of Operating Revenue and Gross Investments. – Economic Studies (Ikonomicheski Izsledvania), 32(7), pp. 114-138.*

Introduction

One of the main difficulties in evaluating enterprises is that none of the known and used approaches and methods are good and reliable enough. Each of them has its weaknesses and shortcomings, which reduces confidence in the final result. This requires a more in-depth study of the individual components of the various valuation methods, or at least of those perceived as the most promising. The DCF enterprise valuation model is traditionally considered to be such, which only emphasizes the *relevance* of the present study.

The purpose of the study is to verify and possibly improve the reliability of forecasting future free operating cash flows, based on publicly available data from the financial statements of companies. *The object* of the study is the DCF enterprise valuation model. The *subject* of the research is the determination of the future free operating cash flows. In the first part of the broader research of the authors, the emphasis was on the dependence between the *dynamics of operating revenue and operating expenses* (Nenkov, Hristozov, 2022). In the present study, the emphasis is on the dependence between the *dynamics of operating revenue and investment expenditures of the enterprise*.

The main hypothesis of this research paper is that there is a significant interdependence between the *dynamics of operating revenue and investment expenditures of the enterprise*, which should be used in forecasting future operating free cash flows (FCFF) within the application of the DCF enterprise valuation model.

1. Basic Problems of Determining the Value of Companies

Generally speaking, the main reason for the difficulty in determining the true value of companies is that it is hidden and invisible. What is usually visible and clear is the acquisition price of the respective enterprise, but it is something different. According to Benjamin Graham and Warren Buffett, "*Price* is what you pay, *value* is what you get" (Graham, 2006; Morris, 2009). Precisely in this connection, Iliya Guevski quotes the often-used aphorism: "Accounting specialists know the price of every asset, but they do not know the value of any of them" (Guevski, 2001). The first – the price (of acquisition) should be perceived as an *investment expense (investment cost) of the acquisition project,* and the second should be perceived as the *value of the acquired* assets (Nenkov, 2005).

In this regard, the attempts of leading authorities in this field to bring order and clarity on this are numerous. The various associations and other organizational structures of professional business appraisers have made and continue to make serious efforts to clarify the category of "value", and what should be looked for and determined in the valuation of businesses and other assets. This is most often done along the lines of business valuation standards, developed by these organizations and in particular in their "standards of value" section. The problem is that a unified and generally accepted concept is never reached. In the different valuation standards, in the valuation and in the judicial practice, different concepts related to value are used. The set of specific variants (dimensions) of "value", used by practitioners in the field of business valuation, is relatively wide (International Valuation Standards Committee, 2001; The European Group of Valuers' Associations (TEGOVA)), including:

- Fair market value;
- Fair value;
- Investment value;
- Intrinsic value;
- Going-concern value;
- Liquidation value;
- Book value.

According to an impressive body of eminent valuation experts in the US and Canada, led by James Hitchner, "The five primary standards of value are:

- Fair market value – FMV;
- Investment value;
- Intrinsic value;
- Fair value/state rights;
- Fair value /financial reporting/" (Hitchner, 2017).

U.S. Treasury regulations define *fair market value* as "the price at which the property would pass from the hands of a willing seller to the hands of a willing buyer where neither is forced to sell or buy and both have sufficient knowledge of the material facts" (Hitchner, 2017). Thus, the fair market value for tax purposes assumes a hypothetical willing buyer and a hypothetical willing seller.

In contrast, *investment value* is associated with a specific buyer or seller and with the characteristics that the buyer or seller brings to the transaction. The International Glossary defines investment value as "the value for a particular investor, based on his individual investment requirements and expectations". Each of the various potential investors competing to buy the same company usually offers a quite different price, because, for each of them, the respective price reflects their individual views of the prospects and synergies that that buyer associates with the particular deal. The investment value also normally reflects the level of risk from the perspective of the particular investor, rather than from the perspective of the market as a whole (Hitchner, 2017).

According to Hitchner, *intrinsic value* is based on the fundamental analysis of companies, especially public ones. This is the value most often taught in finance courses and is the basis of finance textbooks. Intrinsic value is also defined as the *"true"* or *"actual" value*, which is calculated based on the available facts. It is often called a *"fundamental" value*. It is actually an analytical judgment of value that is based on the inherent characteristics of the investment in question (rather than its characteristics according to a particular investor). According to Hitchner, intrinsic value is not often applied to private companies (Hitchner, 2017).

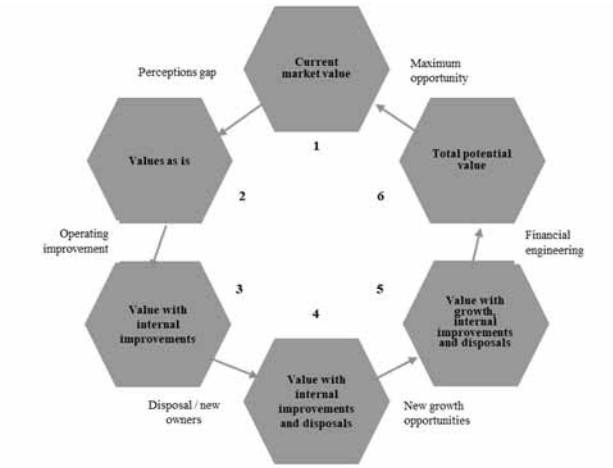
Fair value (state law) is the standard of value for actions by the relevant states, such as in rights disputes or shareholder oppression court cases. In most states, the *fair value standard* is associated with *fair market value*, but without the discounts for lack of control and lack of liquidity. According to an interpretation published by the American Bar Association, "*fair*

value is the value of the shares immediately before the corporate action to which the shareholder objects, excluding any appreciation or depreciation pending the corporate action, unless the exclusion would be unfair" (Hitchner, 2017).

Fair value (financial reporting) is the value standard for financial reporting purposes according to Accounting Standards Codification (ASC). The latter was issued by the Financial Accounting Standards Committee. According to ASC 820, "*fair value* is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the determination date". Fair value for financial reporting purposes is often equated with fair market value. However, in certain situations, such as buying a business, the fair value of a company or part of a company also includes synergies from a transaction, if any. In such cases, the purchase price approximates investment value more closely than fair market value or fair value (Hitchner, 2017).

It is logical to ask the question of which of the above values is correct. In the context of the specifics discussed and the difficulties in finding the actual value, it may turn out that any of the above values are correct. Copeland, Murrin and Koller present the so-called hexagon of restructuring, which actually demonstrates this diversity of perceptions about the value of the company at the same time (Copeland, Murrin, Koller, 2000). Their goal is to analyze the company from the point of view of value management, and more precisely, its management for value creation. The hexagon figure shows the company's potential in this regard (Figure 1).

Figure 1. Restructuring Hexagon



Source: Copeland, T., Koller, T., Murrin, J., 2000, Valuation – Measuring and Managing the Value of Companies, John Wiley & Sons, New York.

At the same time, however, this hexagon demonstrates something very important and useful to analysts and appraisers of any public company's stock. It shows how, in relation to the same company, at the same time, there are quite a number of different perceptions of its

value. This logic is completely compatible with the fact that the considered standards of value are quite few in number and are often mixed with each other.

Instead of being in the place of the CEO of the company (as in the analysis of Copeland, Murrin and Koller), we can put ourselves in the place of a potential candidate to acquire the company in question. The visible value of the company (Figure 1) is *the current market value* (1). This is actually the market price of one share of stock or, alternatively, the market capitalization of the company (market price per share times the number of common shares outstanding). This is the value that the market sees at the moment.

At the same time, however, a parallel valuation of the company, by means of a set of valuation methods and models, may show another, higher value (so we assume in this case) – this is *the value of the company as is* (2). This value may have been obtained through DCF valuation models, comparative valuation methods, or otherwise. This assessment should assume that the company will continue to function as before, without any changes in management and efficiency. Accordingly, the forecasting of future cash flows is based on these assumptions. If the assessment is correct, then it turns out that the company is undervalued by the market. There is a discrepancy in the perceptions regarding the value (perceptions gap) – (2-1).

The possible differences and discrepancies do not stop there. In practice, every company has opportunities for internal improvements that lead to an increase in its value. In the overwhelming majority of cases, so-called strategic investors intend to take advantage of these opportunities and take this into account when trying to predict the value of the company after a possible acquisition. This is how we arrive at the *value after internal operating improvements* (3) and the next difference – (3-2).

The value of the same company can be further increased by shedding underperforming businesses, which is a more radical step and is most often undertaken after a change of ownership. This is how value is arrived at *after internal improvements and disposals* – (4). This in turn leads to new growth opportunities to arrive at *value through growth, internal improvements and disposals* – (5). In such an improved company, the possibilities of financial engineering can be used to further increase the value, for example through hedging, better matching of incoming and outgoing cash flows and risk reduction. This contributes to a reduction in the cost of capital and the discount rate, and hence to an increase in the calculated intrinsic value. This is how we arrive at the *overall potential value* – (6).

The difference between this *total potential value* (6) and *the current market value* (1) can be extremely large at times – (6-1). It expresses *the maximum possibility* of achieving additional value for a strategic investor who succeeds in acquiring the company in question at its current market price. The opportunities for such an increase in the value of poorly managed companies are most significant, which is why they are also among the most desirable takeover targets. These opportunities are more limited in well-managed businesses, for the simple reason that in them a large part of the considered opportunities for improvement have already been realized.

Logically, the question arises as to which of the six considered values should be correct. In fact, any one of them may be correct for the needs of the particular evaluation, depending on what the task before the appraiser is and what the resulting assumptions are. If one is looking

for a fair value of the company as it is now, then value (2) seems most appropriate. However, a potential buyer may need to know what additional value they could achieve after various improvements. Thus, 3, 4, 5 and 6 above should all correspond to the *investment value standard*. At the same time, each of the values 2, 3, 4, 5 and 6 should also be an *intrinsic value* if it is determined on the basis of fundamental analysis, i.e. based on discounted future cash flows. They should also meet the premise for a *going-concern enterprise*, given the basic assumptions underlying this example. All these multiple interpretations of the sought value often introduce additional complications for appraisers and misinterpretations regarding appropriate assumptions.

Aswath Damodaran, for his part, asks a very logical question in relation to the valuation of companies and shares: "What are we looking for – *the price* or the *value*?" (Are we pricing or valuing?) (Damodaran, 2020). It seems that the majority of investors, analysts and appraisers are not clear on this issue. And from this arise the majority of the problems in valuation, as well as the subsequent disputes. Damodaran raises this question primarily in the context of the behaviour of the various players who buy and sell shares in the capital markets and their strategies. In the authors' previous article, this division was advocated in reference to Benjamin Graham's understanding of which players should be defined as investors and which as traders and speculators (Graham, Dodd, 2009).

Damodaran draws a clear line between price and value, although he believes that the two terms are used interchangeably in both academia and practice (Damodaran, 2020). In the stock market, price on the one hand, and value, on the other, are dictated by very different driving forces. The drivers of value are: *cash flow, growth and risk*. Discounted cash flow models are most commonly used to apply the above fundamental variables, but there are also other ways to arrive at intrinsic value (Damodaran, 2019).

The forces determining stock prices are two: simpler, but more powerful – *demand and supply*. While rational investors may use only the fundamental variables in determining supply and demand, at the same time these fundamentals are drowned out in the market by the influence of sentiment and momentum. Markets are price-creating mechanisms, not value-creating mechanisms (Graham, Dodd, 2009). In this spirit, Benjamin Graham also calls them "voting machines", but not machines for determining the "weight" of the respective shares (Graham, 2006).

Damodaran's above question is important not only in relation to the motives and actions of the two main groups of buyers of shares in the market – traders and investors. It is also completely up to date in the context of the work of analysts and appraisers, in the process of valuing the shares of public and non-public enterprises and businesses. In most valuations, they are not quite clear whether they are looking for intrinsic value or are more interested in arriving at a result close to market price. Standards sometimes, instead of helping in this regard, make things even more confusing. For example, in many situations the choice of an appropriate standard of value is dictated by the circumstances, the intended use of the appraisal, the contract, the requirements of the law, or other factors. In other situations, the choice of standard of value may be clear, but the meaning of that standard is not particularly clear.

2. DCF Valuation Models – Key Features and Challenges

Regardless of the many classifications of methods and models for the valuation of enterprises and their common stocks, regardless of the significant number of methods and models in most of these classifications (Zukin, 1990; Damodaran, 2002; Copeland, Antikarov, 2001), the possibilities ultimately boil down to three main approaches (Nenkov, 2005). The reason for this is that there are three possible starting points for deriving the value of enterprises – assets, expected earnings and the market (Guevski, 2001). According to Hitchner, there are only three approaches to valuing any asset, business, or part of a business:

1. The income approach
2. The market approach
3. The asset approach

Again, according to him, there are no other approaches to determining value. However, there are multiple methods within each of the approaches that could be used in a single assessment (Hitchner, 2017).

An assessment should consider the possibilities of applying all three approaches, although in practice all three are rarely present together. For example, the asset-based approach is less often used in the valuation of going concern. The most common argument is that its methods do not consider the potential for future income (cash flows) and fail to value intangible assets. At the same time, the asset-based approach is very useful when valuing businesses that are before closing down or have ceased operations and are in liquidation.

A major advantage of *the income-based approach* is that its methods directly target the very sources of value of the assets being appraised – the future income they will bring. This is by no means accidental. According to Hitchner, value looks to the future. “Although historical information is required to determine value, its main driver is expected future benefits. What investors are buying are tomorrow's cash flows, not yesterday's, not today's (Hitchner, 2017). Therefore, when the precondition of value is "going concern", the methods and models of this approach are among the most used.

The main objections to this approach are in relation to the need to predict future cash flows and then bring them to present value by means of discounting. Both processes are subject to a number of subjective assumptions and related possible deviations from reality. These disadvantages of income methods are particularly pronounced in conditions of high inflation and uncertainty.

The two main methods within this approach are *the Discounted Cash Flow Method* and *the Income Capitalization Method*. Both methods are designed to determine the present value of the expected future income (cash flows) from the operation of the assessed enterprise. In modern practice, both methods are applied in combination, by means of a set of specific models. They can be classified into two main groups (Reilly, Brown, 2003; Koller, Goedhart, Wessels, 2015):

- **DCF models for direct equity valuation:**
  - Dividend discounted model (DDM) and
  - DCF equity valuation model.
- **DCF models for enterprise-wide valuation:**
  - Adjusted present value (APV) model,
  - DCF enterprise valuation model,
  - Economic profit model (Extra return model).

The DCF enterprise valuation model is based on the assumption of a going concern, i.e. that the evaluated companies will continue their operations in the future, ideally until infinity. According to various studies, it is one of the most widely used assessment models (Bancel, Mittoo, 2014), along with relative valuation methods (Fernandez, 2019). As its name suggests, it is used to determine the value of the enterprise as a whole. Since the bearer of this value are its assets, the model actually determines the value of the assets. In other words, this model determines the value resulting from the activity of the enterprise, or the so-called value entire enterprise value, which belongs to the two main groups of investors in the same enterprise – owners (shareholders) and creditors. The second group includes the holders of the company's interest-bearing debt. Once the value of the entire enterprise resulting from its activity has been determined, the model makes it possible to determine the value of equity by subtracting the value of interest-bearing debt and some other liabilities, such as the value of preferred shares (Pinto, Henry, Robinson, Stowe, 2010). Thus, it becomes clear what price is worth paying for the equity capital as a whole, for one ordinary share, respectively for the majority package, giving the right to actual management of the company's assets (O'Brien, 2003).

The model is based on the future expected free operating cash flows (free cash flows to the firm – FCFF) and their discounting to the present. *The operating value* of an enterprise is defined as the sum of the company's discounted operating free cash flows (FCFF). To this value is added the value of *non-operating assets* to obtain the value of the enterprise as a whole. From it the value of the interest-bearing debt is deducted to arrive at the value of equity, and subsequently the value of a share of common stock (Nenkov, 2015).

The application of the DCF enterprise valuation model goes through several phases, but the most problematic and challenging are two of them (Patena, 2011):

- Determination of expected free operating cash flows and
- Determining the discount rate for these cash flows.

These two components of the DCF enterprise model are usually the most heavily contested. They are the most labour-intensive and the most challenging. From these two components come the biggest possible deviations in the final result. According to Pablo Fernandez and Andrada Bilan the most frequent omissions and errors in the application of DCF models are also related to them (Fernandez, Andrada Bilan, 2007). The present study is focused only on

part of the problems related to the determination of the expected free operating cash flows to the firm (FCFF).

The scheme for determining the free operating cash flow for the firm (FCFF) is presented in Table 1. It is clear from the table that the free cash flow for each year is a residual value. It is obtained by successively deducting different types of expenses from the revenue from the company's operations. First, the costs operating costs without depreciation are deducted. Then, in a separate order, depreciation is deducted as a more specific type of expense. The latter are only accounting expenses, non-cash expenses (Pinto, Henry, Robinson, Stowe, 2010), or the so-called quasi-expenditure. At the next stage, one fiscal expense is charged and deducted – this is the corporate tax (line 6 of the scheme).

Table 1. Simple scheme for determining the Operating free cash flow (FCFF)

Row	Position
1.	Operating revenue
2.	– Operating expenditures (less D&A)
3.	= EBITDA (Earnings before interest, tax, depreciation and amortization)
4.	– Depreciation and amortization (D&A)
5.	**= EBIT (Operating profit before tax)**
6.	– Corporate tax (on EBIT)
7.	**= Net operating profit after tax (NOPAT)**
8.	+ Depreciation and amortization (D&A)
9.	**= Gross cash flow (r.7 + r.8)**
10.	Increase of Net Operating Working Capital (NOWC)
11.	+ Capital expenditures (investments in non-current assets)
12.	**= Gross investments (r.10 + r.11)**
13.	**= Operating free cash flow (FCFF) (r.9 – r.12)**

Source: authors' interpretation.

This is how we arrive at one of the key financial indicators – the company's net operating profit (NOPAT) – row 7 of the scheme. NOPAT, along with depreciation and amortization, form gross cash flow, which is commonly referred to as operating cash flow. NOPAT and depreciation are the two internal sources of funding for new investments in the business.

In order to arrive at the free operating cash flow, it is necessary to subtract the investment costs in the activity for the relevant year. This necessity stems from the basic presumption for applying the DCF enterprise model – the going concern presumption. It means that the enterprise is projected to continue operating and generating cash flows long enough into the future, ideally indefinitely. This implies that the enterprise will continue to be competitive, develop and modernize. For this purpose, the necessary investments will have to be made and therefore such costs are foreseen within the framework of the model. The estimated gross investments are on line 12 of the scheme and are the sum of two types of investment costs:

- Increase in net operating working capital – NOWC (line 10). The increase is the result of investing in current (short-term) operating assets;
- Capital expenditure (line 11). These are investments to acquire non-current assets.

After subtracting the gross investments from the gross cash flow, the free operating cash flows for the relevant year (FCFF) are obtained on line 13.

As it turns out, forecasting future free operating cash flows is one of the two biggest challenges in applying the DCF enterprise valuation model. For this purpose, it starts with an analysis of the assessed enterprise in historical terms. A major source of data is the company's annual financial statements – at least five, ten or more years back (Penman, 2013; Barker, 2001). Most important are *The Comprehensive Income Statement (CIS)* and the *Balance Sheet (The Statement on Financial Position).* A qualitative analysis of the data in them shows very well the performance of the company in the past and makes it possible to make reliable predictions about future revenue and expenses. Modern DCF valuation models are tailored to operate on this publicly available information (Palepu, Healy, 2012).

From the scheme for determining free operating cash flow (FCFF), it can be seen that the quantities required for forecasting are five in number:

- Operating revenue;
- Operating expenses (excluding depreciation);
- Depreciation;
- Increase in net operating working capital;
- Capital expenditure.

The five variables are not completely independent, they are bound in a certain way to each other. Projecting each one on its own inevitably leads to illogical future values and distorted free cash flows. This, in turn, leads to a highly distorted valuation of the enterprise.

The most important point here is to be logically consistent. For this purpose, it is important to study and know the dependencies between the individual input variables. This is one of the main tasks in the present study. Thus, for example, maintaining the high competitiveness of the enterprise during the years of the explicit forecast period and after that will also require investments of adequate amounts. This is also a decisive factor for the projected future revenues, including their growth rate. The same goes for the future profit margin. If we are making more intensive investments in the activity, this means that the revenue and profit margin in turn should also increase, and vice versa.

Oftentimes, in order to obtain a higher operating value, the projected capital expenditure or increase in working capital is minimized. Conversely, grossly understated valuations result when these investment costs are inflated beyond what is normally necessary. Here we are talking not only about unconscious gaps in forecasts, but also about cases of conscious manipulation of the amount of these costs. The reason is that accurately forecasting capital expenditures and growth in net operating working capital is a matter of increased difficulty (Nenkov, 2017).

One of the ways used to make the forecasts of the 5 input variables is by "tying" the four types of expenses to the operating revenue. Thus, only one growth rate is predicted – that of revenues. For this purpose, it is necessary to express each of the types of expenses as a percentage of revenues. This is usually done on the basis of the average relative share of the

respective expense to the revenue in historical terms. This is one of the important aspects where the analysis of financial statements over a longer historical period is very useful. It would be even more useful to have information on how the respective types of expenses correlate with revenues based on a wider sample of companies, for example for the sector as a whole.

In the mentioned previous scientific work of the authors, the relationship between the dynamics of operating revenue, on the one hand, and operating expenses, on the other hand, was investigated (Nenkov, Hristozov, 2022). In the empirical part of the present study, *the relationship between the dynamics of operating revenue, on the one hand, and the dynamics of each of the two components of gross investments, on the other hand, is investigated.*

Unlike operating expenses, the two components of gross investment – increase in net operating working capital and capital expenditures, are not directly visible on the Income Statement or Balance Sheet. It is necessary for the analyst to determine them on the basis of other items in the reports.

***Determining the annual increase of net operating working capital (NOWC)*:**

To calculate the change in NOWC, it is first necessary to forecast the value of NOWC by year. Net working capital (NWC) generally represents the difference between current assets (CA) and current liabilities (CL) on the balance sheet, i.e.:

$$NWC = CA - CL \quad (1)$$

With DCF valuation models, however, it is only about *net **operating** working capital (NOWC)*, i.e. only for that part of the NWC that is invested in the company's operations (operating assets). In other words, NOWC does not include current financial assets. There is another difference from the traditional understanding of net working capital. It is that NOWC is not only associated with long-term sources of capital, but also includes current interest-bearing sources of financing. For these reasons, as already explained, NOWC equals operating current assets less current (short-term) non-interest-bearing liabilities, i.e.:

$$NOWC = \text{Operating CA} - \text{Non-interest-bearing CL} = \quad (2)$$

$$= (CA - \text{Current financial assets}) - (CL - \text{Current interest-bearing debt})$$

In this way, on the basis of the data in the annual balance sheets, the amount of NOWC for each year is determined. According to the formulas of some of the leading authors in the field of DCF models, financial assets should be fully deducted when determining the NOWC, including the entire amount of cash. According to other authors, only so-called "excess" funds should be deducted from cash, i.e. the cash not needed to operate the business (Copeland, Koller, Murrin, 2000). This is more justified, since there should always be a certain minimum amount of operating cash in the operating current assets to ensure the normal circulation of the current assets. Cash above this amount is practically not necessary for everyday operations and becomes non-operating financial assets. However, in most cases, the full amount of cash is deducted as part of current financial assets.

The growth of NOWC over the years, which enters as part of gross investment, is obtained as follows:

$$\Delta \text{ NOWC}_{2022} = \text{NOWC}_{2022} - \text{NOWC}_{2021} \quad (3)$$

This is the procedure for determining the growth of the NOWC for each individual year, for the purposes of determining the amount of gross investments. This will not be necessary in the present study, as the annual revenues are to be compared with the annual NOWC amounts.

***Determining the annual amount of capital expenditures (CAPEX)*:**

Capital expenditures are the fifth important input variable on which free operating cash flows directly depend. Anticipating and making adequate capital expenditures is key to maintaining and even increasing the future competitiveness of the enterprise. For the purposes of this valuation model, capital expenditure for year 'X' can most easily be determined as the book value of assets for this year 'X', minus the book value of assets for the previous year 'X-1', plus the depreciation for year "X". So, for example, for 2022, things will look like this:

$$\text{CAPITAL EXPENDITURES}_{2022} \quad (4)$$

$$= \text{NON-CURRENT ASSETS}_{2022} \text{ (Book value) -}$$

$$- \text{NON-CURRENT ASSETS}_{2021} \text{ (Balance value) + AMORTIZATION}_{2022}$$

For this purpose, the balance sheet value of the assets is taken from the Statement of Financial Position (Balance Sheet), and depreciation from the Income Statement. If in the relevant year there is neither acquisition of new, nor liquidation of old non-current assets, the result according to the above formula will be zero.

Using the averages of NOWC and capex is appropriate for making future projections but should be applied with caution given some influencing factors, the same applies to free cash flow forecasting. Market and industry factors, business cycles or other company-specific factors may have an impact. From the point of view of individual economic branches, the situation also differs. In this regard, it is good to supplement the forecasts with an analysis of the current market conditions, the specifics of the sector and expectations for the economic situation in the given region. The authors aim to refine these predictions.

3. Empirical Study of the Relationship between the Dynamics of Operating Revenue and the Dynamics of Gross Investments of Enterprises in Bulgaria

This empirical study is made in connection with the above approach of “tying” each of the four groups of expenditures to revenue, while trying to make projections of future operating free cash flows to the firm (FCFF). The main objective is to analyze the relationship between the dynamics of operating revenues, on the one hand, and the dynamics of gross investment expenditures, on the other hand. The study is made using a broad database for all non-financial corporations (NFC) in Bulgaria. The database is prepared annually by the National Institute of Statistics (NIS) of the country, and previous studies in the field of financial management indicate that it is extremely appropriate and useful for this purpose (Hristozov, 2021). The database itself includes the annual aggregate Comprehensive Income Statements and the aggregate Balance Sheets (Statements of Financial Position) by sectors of non-

financial corporations in Bulgaria, for the period 2008-2020. In this database, all non-financial corporations in the country are grouped into 17 sectors – from A to S (not including K and O, which are financial). The 17 sectors are in accordance with the national classification, and are as follows:

A. Agriculture, Forestry and Fisheries

B. Mining Industry

C. Manufacturing Industry

D. Energy (Production and Distribution of Electricity and Heat, and Gaseous Fuels)

E. Water Supply, Sewerage, Waste Management and Remediation Activities

F. Construction

G. Trade; Repair of Motor Vehicles and Motorcycles

H. Transport, Warehousing and Postal Services

I. Hotels and Restaurants

J. Creation and Dissemination of Creative Products; Telecommunications

L. Real Estate Operations

M. Professional Activities and Research

N. Administrative and Support Service Activities

P. Education

Q. Human Health and Social Work

R. Culture, Sport and Entertainment

S. Other Activities

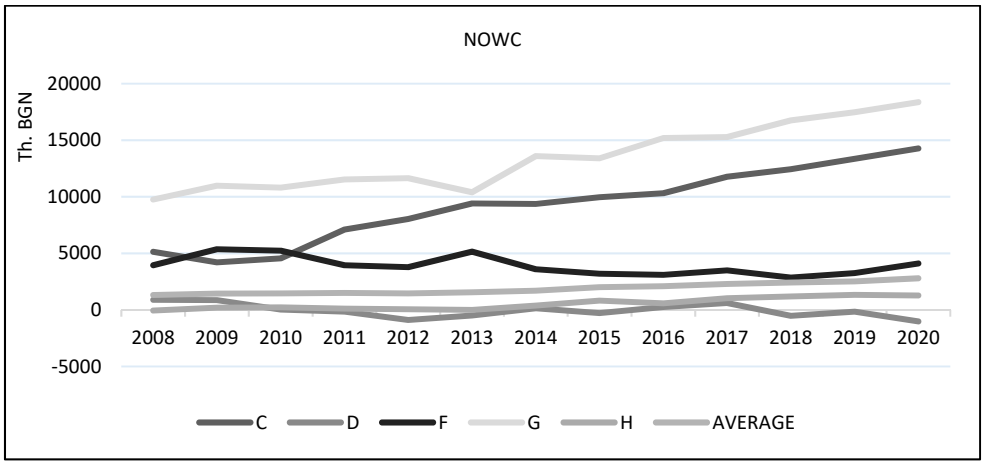
Considering that the study is related to the application of DCF models to the valuation of businesses, it is important to note that some of the sectors include institutions that are not business structures. This applies mostly to sectors M to S. The organization of these types of activities suggests that they are mainly concentrated in public institutions or in other non-business structures. The analysis is anyway focused only on the 5 largest business sectors according to their total turnover. These are: sector G (Trade; +), followed by sector C (Manufacturing), sector F (Construction), sector H (Transport, +), sector D (Energy).

3.1. Investigation of the dynamics of net operating working capital (NOWC) as a relative share of operating revenue

Figure 2 illustrates the dynamics of net operating working capital (NOWC) in the five largest sectors – G, C, F, H, D. It should be noted that the number of enterprises in the database has grown over the years, including for those 5 sectors. This distorts the picture of the actual growth of the companies' revenue and NOWC in absolute terms. However, in this case, the

behaviour of these two indicators relative to each other is of interest. It is logical to assume that the changing number of enterprises in the sample similarly affects both indicators, so that possible distortions should neutralize each other.

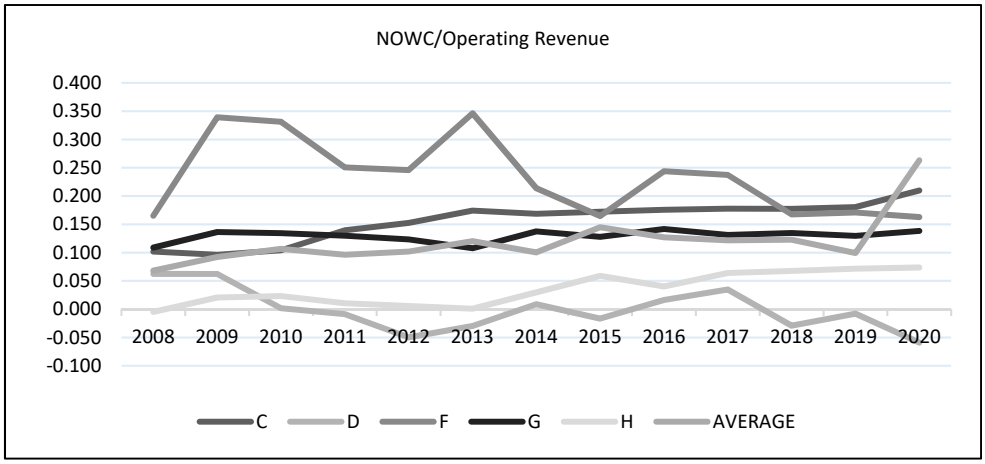
Figure 2. Dynamics of NOWC in the 5 largest sectors (2008-2020)



Source: NSI, calculations of the authors.

Figure 2 shows a great diversity of the dynamics of NOWCs in absolute terms by sector, with some showing an upward trend – in sectors G (trade), C (manufacturing industry), H (transport +). At the same time, in sectors D (energy) and F (construction), the trend is rather flat or slightly downward. It is clear that the size of NOWCs moves in different ways, and the differences by sector are often very strong. On this basis, it is difficult to look for any general characteristics and indicators to be used as benchmarks. This can be explained by the multiple factors that affect the size of the NOOC in the short, medium and long term. For example, it depends in particular on the applied policy of financing current assets (Taseva-Petkova, 2021). From the formula for determining the NOWC shown in the previous point, it is clear that it is a residual value and is obtained by subtracting the non-interest-bearing current liabilities from the operating current assets. It is an expression of that part of the capital invested in the enterprise, which is directed into current operating assets. If the firm finances these current assets primarily through invested capital (equity + interest-bearing debt), then NOWC will be larger. If, on the other hand, the company finances the same current assets primarily at the expense of current liabilities (non-interest-bearing) to suppliers, to personnel and others, then the NOWC will be a smaller amount. Thus, the dynamics of NOWC are largely predetermined by the short-term financing policy followed, and it is individual for each company. An important feature of the studied period is that during a large part of it, and especially in the first years after the global financial crisis, intercompany indebtedness in Bulgaria reached record-high values. Accounts payable became the main source of financing current assets for the majority of companies in the country (Taseva, 2019).

Figure 3. Five sectors: NOWC as a relative share of operating revenue



Source: NSI, calculations of the authors.

Figure 3 illustrates how NOWC changed as a relative share of the operating revenue of the 5 largest sectors over the observed period 2008-2020. An important fact in this particular analysis is that the observed period (2008-2020) begins with the years of the global financial crisis and ends with the crisis caused by the COVID-19 pandemic. The significant differentiation in terms of the needed working capital (working capital requirements) of the enterprises from the various sectors, for the production and realization of a unit of production, is striking. The share of NOWCs is highest in sector F (construction), which ranges widely from about 15% to 35%, followed by that of sector C (manufacturing), which ranges between 9.6% and 21%. It is followed by sector G (trade) with a range between 10.8% and 14.2%. The lowest percentage of NOWC is in sector D (energy), which hovers around 0.1% (Table 2). Figure 3 also shows the average value by year for all 17 non-financial sectors – it is illustrated by the dotted line. If we exclude two crisis years (the first and the last of the period), the average relative share of NOWC of revenue moves in a narrow range – between 10% and 15%, with the average for the entire period being **12%**. This number can be taken as an indicator of the required NOWC on average for the economy as a whole. On average, for the 17 non-financial sectors, the trend is rather horizontal in terms of the share of NOWC, if the crisis years at the beginning and end are excluded.

The exact NOWC values by year for each of the five sectors are best seen in Table 2. The trends for the individual sectors observed are best illustrated in the individual sector graphs in Figures 4, 5, 6, 7 and 8, respectively. All five graphs show serious short-term fluctuations in the relative share of NOWCs to revenue. In other words, the short-term NOWC is far from following the dynamics of revenue, as should be expected in theory. The reason for such expectations is that, other things being equal, the increase in the company's operating revenue should lead to a similar increase in current operating assets, and hence in NOWC. Accordingly, in the event of a decrease in revenue, the opposite should happen. The following two things are primarily meant here under “other things being equal”: 1) the rate of turnover

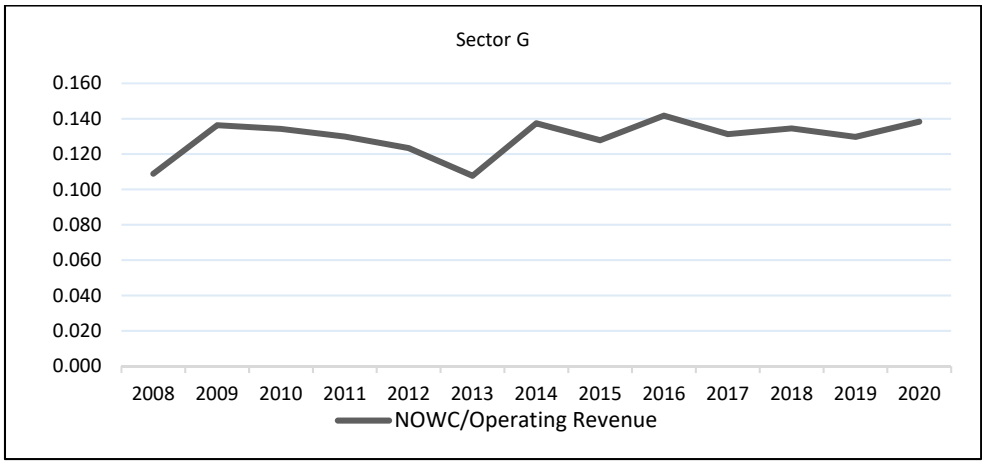
of current operating assets remains unchanged, and 2) the financing structure of current operating assets remains unchanged. Most likely, in the short term, during the observed period 2008-2020, both dimensions were characterized by serious changes, leading to a continuous change in the required NOWC.

Table 2. NOWC as a percentage of operating revenue (2008-2020)

Year	Sector G	Sector C	Sector F	Sector H	Sector D
2008	10.9	10.2	16.5	-0.5	6.2
2009	13.6	9.6	33.9	2.1	6.2
2010	13.4	10.4	33.1	2.3	0.2
2011	13.0	14.0	25.1	1.1	-0.9
2012	12.3	15.3	24.6	0.6	-5.0
2013	10.8	17.4	34.6	0.1	-3.0
2014	13.7	16.9	21.4	3.0	0.9
2015	12.8	17.2	16.5	5.9	-1.7
2016	14.2	17.6	24.4	4.0	1.6
2017	13.1	17.8	23.7	6.4	3.5
2018	13.5	17.7	16.8	6.7	-2.9
2019	13.0	18.1	17.1	7.2	-0.8
2020	13.8	21.0	16.3	7.4	-5.9
Average	12.9	15.6	23.4	3.6	-0.1
Minimum	10.8	9.6	16.3	-0.5	-5.9
Maximum	14.2	21.0	34.6	7.4	6.2

Source: NSI, calculations of the authors.

Figure 4. Sector G: NOWC as a relative share of operating revenue

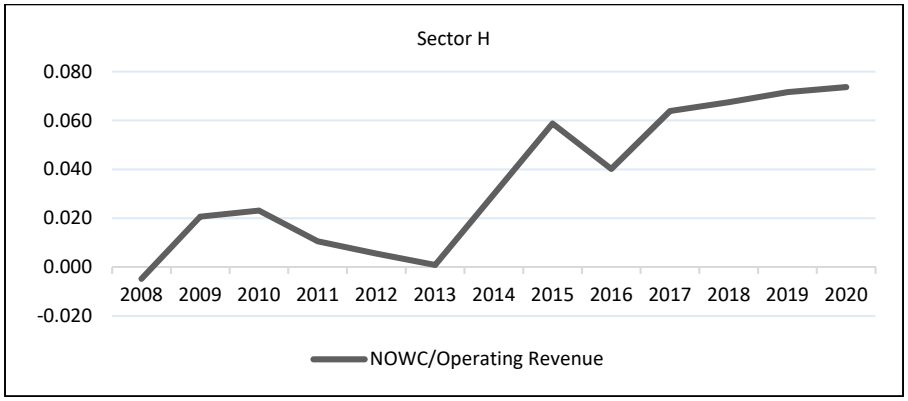


Source: NSI, calculations of the authors.

For the purposes of determining future free operating cash flows (FCFF), however, average values are used. Therefore, it is more important how the NOWC moves in relation to operating revenue in the medium and long term, i.e. as a trend – whether it gravitates towards certain average values. Figure 4 shows something similar – if the line in Figure 4 is smoothed,

it will be more horizontal like (especially if the crisis years at the beginning and end are removed). This testifies that in sector G (trade), there is a relatively stable share of NOWC compared to revenue in the medium term. Table 2 shows that the average value is 12.9%, the minimum is 10.8%, and the maximum is 14.2% (Table 2). The range in which the relative share of NOWC moves is not large – only 3.8 percentage points.

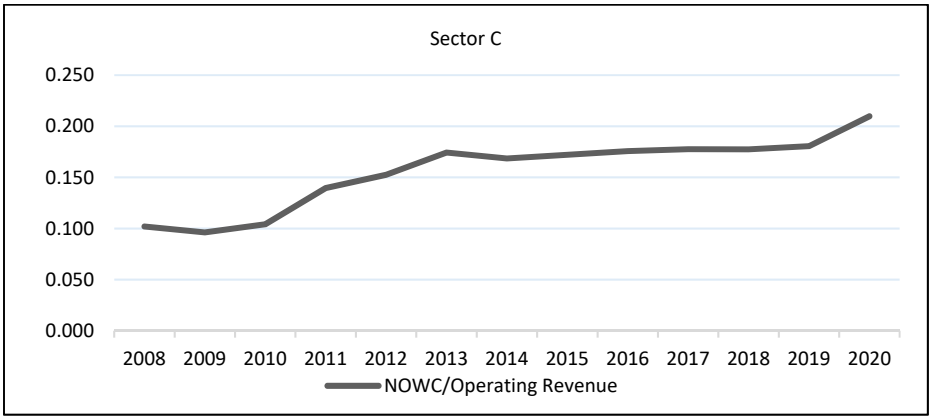
Figure 5: Sector H: NOWC as a relative share of operating revenue



Source: NSI, calculations of the authors.

The picture in Figure 5 (sector H) and Fig. 6 (sector C) looks quite different. Leaving aside the short-term fluctuations, there is a distinct uptrend in the relative share of NOWC to revenues in both cases. For sector H (transport +), the period started with a relative share of -0.5% and ended with 7.4%. The minimum of -0.5% is for 2008 and the maximum of 7.4% is for the last year 2020 (Table 2).

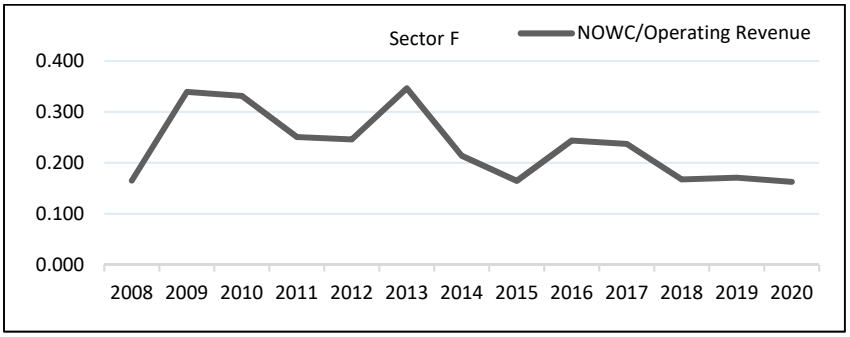
Figure 6. Sector C: NOWC as a relative share of operating revenue



Source: NSI, calculations of the authors.

In sector C (manufacturing), the increase was from 10.2% in 2008 to 21.0% in 2020, which is also the maximum for the period (Figure 6). The minimum of 9.6% was also at the beginning – 2009 (Table 2). The range of growth is also significant – around 11 percentage points. In this situation, the question reasonably arises where the relevant value for each of these two sectors should be sought – rather at the beginning of the period or rather at the end of the period.

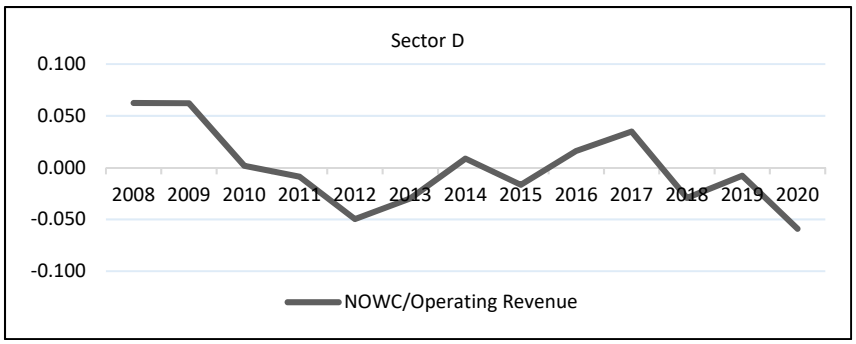
Figure 7. Sector F: NOWC as a relative share of operating revenue



Source: NSI, calculations of the authors.

In the next two sectors – F and D, the opposite trend is observed (Figure 7 and Figure 8) – the relative share of NOWC compared to operating revenue decreases from the beginning to the end of the period, albeit with reservations. The reservations are in relation to the crisis years – 2008 and 2009 at the beginning and 2020 at the end. Sector F (Construction) started at 16.5% in 2008 and ended at almost the same level of 16.3% in 2020, but meanwhile climbed to 33.9% in 2009 and to 34.6% in 2013 (Table 2). If only the start and end years are taken, it would appear that the value of around 16.5% is sustainable, but it is not. If the crisis years – 2008, 2009 and 2020 are removed, then a visible trend of reduction emerges, and a significant one at that. For Sector D (Energy), the trend also appears to be downward on an all-year basis. But if the crisis years in question are removed, a more horizontal trend will emerge, with the share of NOWCs fluctuating around zero.

Figure 8. Sector D: NOWC as a relative share of operating revenue



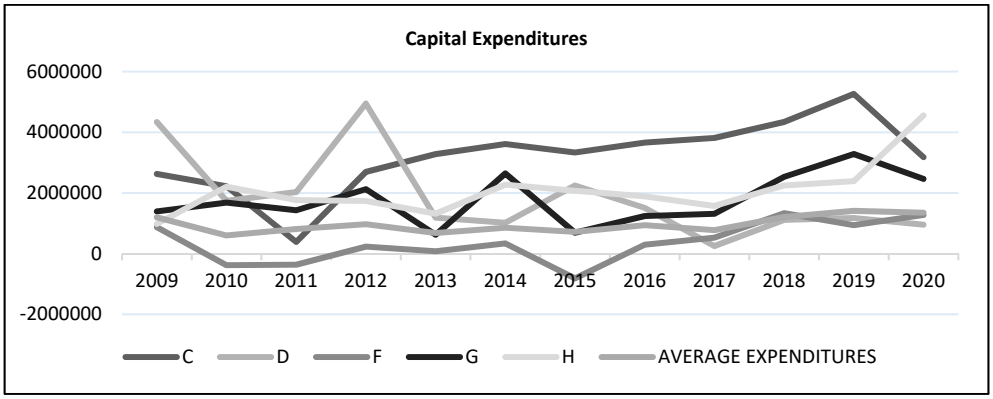
Source: NSI, calculations of the authors

3.2. Investigation of the dynamics of capital expenditures (CAPEX) as a relative share of operating revenue

The explored period in terms of the dynamics of capital expenditures is one year shorter than that of the NOWC analysis – it starts from 2009. The reason is the way of deriving the amount of annual capital expenditures from the financial statements. To determine them, the balance sheet value of non-current assets from the previous year is required. The earliest year in the database is 2008, so the first year for which capital expenditure can be determined is 2009.

The dynamics of capital expenditures (CAPEX) in absolute terms in the five largest sectors – G, C, F, H, D, is shown in Fig. 10. The volume of total capital expenditure incurred in each of the sectors varies very markedly from year to year. No general trend is observed. Clearly, capital expenditure during the period was influenced by a number of short-term factors that affected different sectors of the economy differently. The figure also shows the average value by year for all 17 non-financial sectors (dotted line).

Figure 9. Dynamics of CAPEX in the 5 largest sectors (2009-2020)



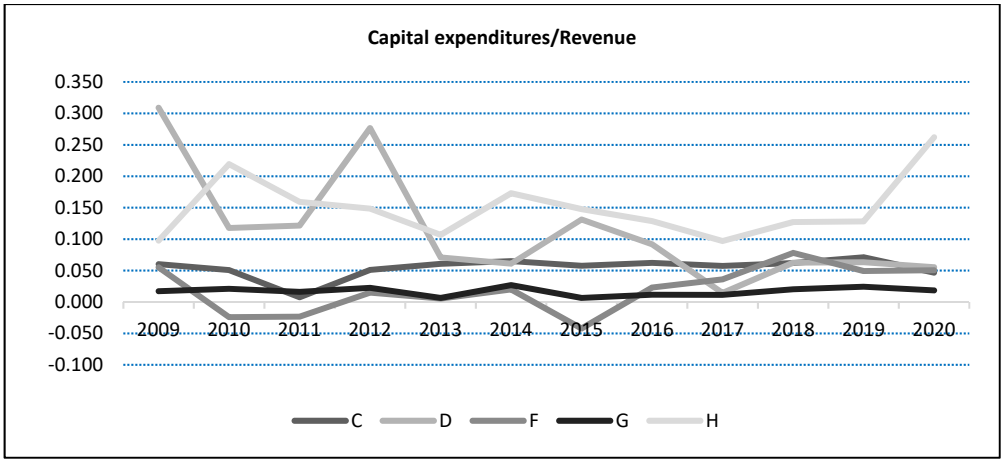
Source: NSI, calculations of the authors.

Of greater interest in this part of the analysis again is how capital expenditures change relative to changes in operating income. Fig. 10 illustrates how capital expenditure moves as a relative share of operating income in the five largest sectors over the period 2009-2020. This share fluctuates significantly by year, especially in some sectors. The average value by year, calculated on the basis of the 17 sectors, also shows significant fluctuations.

The logic behind tying capital expenditure dynamics to revenue dynamics, when forecasting free operating cash flows, is very simple. A decisive factor for maintaining the competitiveness and successful performance of a company in the future is the implementation of successful investments. All other things being equal, the more successful investments are made, the more significant increases in revenue and profits should follow. When the forecasts assume a higher growth rate, this implies that more intensive investments should also be assumed. And the opposite should be true – if there is not enough investment, there will be no growth in revenues and profits. In this sense, the medium- and long-term trends are of

interest to the research here most of all. Even more important is whether there is a reason to project future capital expenditure as a relatively sustainable percentage of revenue.

Figure 10. Five sectors: CAPEX as a relative share of operating revenue



Source: NSI, calculations of the authors.

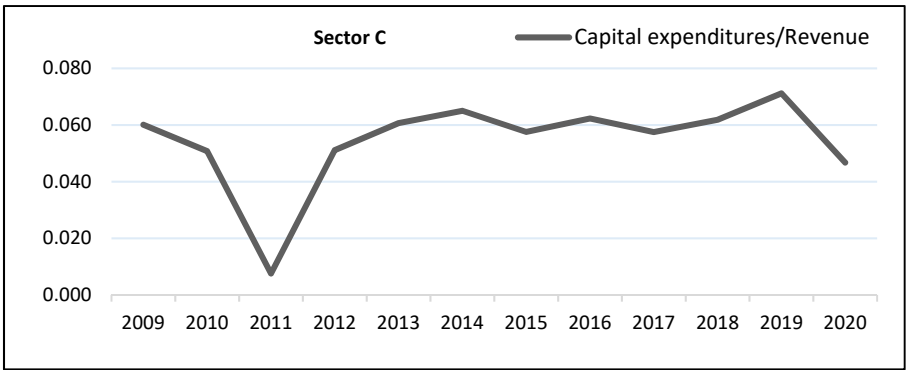
In the short term, however, for individual years, it is normal for the dynamics of capital expenditures to differ from the dynamics of operating income. Not least because there is a lag in the impact of the investments on revenues and profits. In some sectors, this lag may not be particularly large, but in other sectors, it is measured by quite a number of years. In addition, in any given year, capital expenditures, on the one hand, and revenues, on the other hand, are affected by numerous other short-term factors.

Table 3. CAPEX as a percentage of operating revenue (2009-2020)

Year	Sector G	Sector C	Sector F	Sector H	Sector D
2009	1.7	6.0	5.5	9.8	30.9
2010	2.1	5.1	-2.4	21.9	11.8
2011	1.6	0.8	-2.3	15.9	12.2
2012	2.3	5.1	1.5	14.9	27.7
2013	0.6	6.1	0.5	10.7	7.1
2014	2.7	6.5	2.0	17.3	6.1
2015	0.7	5.8	-4.2	14.8	13.1
2016	1.2	6.2	2.3	12.9	9.2
2017	1.1	5.7	3.6	9.7	1.4
2018	2.0	6.2	7.8	12.7	6.3
2019	2.4	7.1	4.9	12.8	6.3
2020	1.9	4.7	5.0	26.2	5.5
Average	1.7	5.4	2.0	15.0	11.5
Minimum	0.6	0.8	-4.2	9.7	1.4
Maximum	2.7	7.1	7.8	26.2	30.9

Table 3 presents the exact percentages by year, averages, minimums and maximums for each of the five largest sectors. Figures 11, 12, 13, 14 and 15 illustrate the dynamics of the relative share of capital expenditure against revenue, separately for each of the 5 sectors.

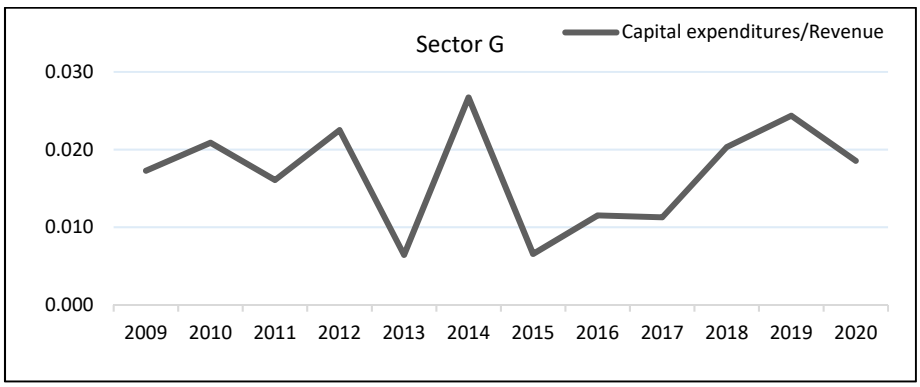
Figure 11. Sector C: CAPEX as a relative share of operating revenue



Source: NSI, calculations of the authors.

For sector C (manufacturing industry) we cannot speak of an increasing or decreasing trend (Figure 11). Rather, it is flat if 2011 is excluded. The period starts with 6.0% capital expenditure (as a relative share to revenue) in 2009 and ends at 4.7% in 2020. The low is 0.8% in 2011, and the maximum is 7.1% in 2019. Excluding the excessively low value in 2011, the level of capital expenditure by year moves in a very narrow range of about 5-7%, with an average of 5.4% (Table 3). This average could be used as a good benchmark for businesses in this sector.

Figure 12. Sector G: CAPEX as a relative share of operating revenue

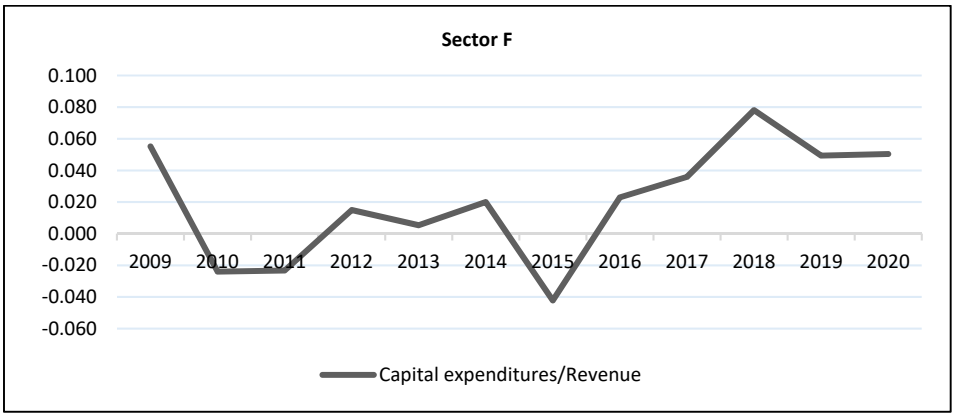


Source: NSI, calculations of the authors.

For sector G (trade), the variation in the relative level of capital expenditure (relative to revenue) is also within a narrow range (Figure 12). The minimum is 0.6% and the maximum

is 2.7%. Here it is also difficult to talk about an increasing or decreasing trend. The period starts at the level of 1.7% and ends at the level of 1.9%. The average of 1.7% could be considered quite representative for this sector (Table 3).

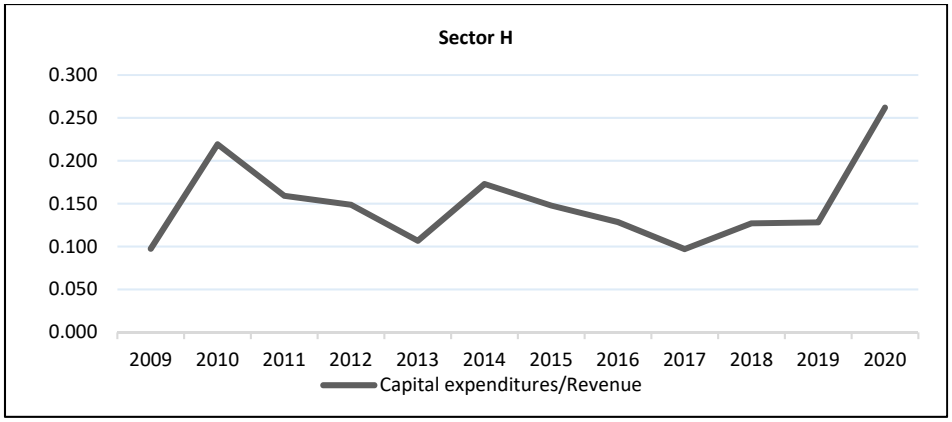
Figure 13. Sector F: CAPEX as a relative share of operating revenue



Source: NSI, calculations of the authors.

In sector F (construction), capital expenditure as a relative share moves in a significantly wider range (Fig. 13). The minimum is -4.2% and the maximum is 7.8% (Table 3). That makes a range of as much as 12 percentage points. In this sector, the negative values of capital expenditure in 2010, 2011 and 2015 make an impression. The period starts at 5.5% (2009) and ends at 5.0%, but this is a bit misleading. In the last 5 years, the levels have been consistently higher than the previous six years (only 2009 is an exception) – there is some upward trend. The average value is 2.0%, but with the large variations, it can hardly be considered representative.

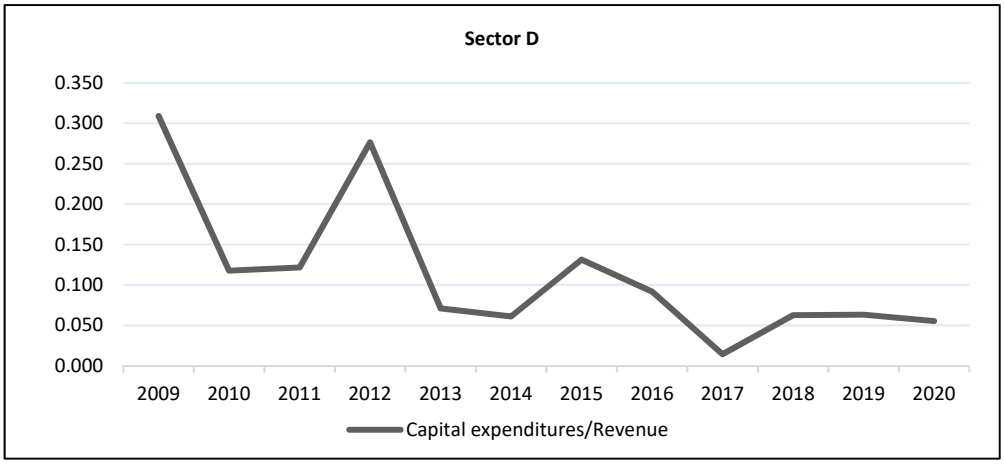
Figure 14. Sector H: CAPEX as a relative share of operating revenue



Source: NSI, calculations of the authors

In sector H (transport +), capital expenditure as a relative share varies even more (Figure 14). The minimum value is 9.7% and the maximum is 26.2%, i.e. the range is as much as 16.5 percentage points (Table 3). The period starts at 9.8% (2009) and ends at 26.2% (2020). However, one cannot speak of an upward trend – if the first and last years are excluded, the situation changes radically. The average value is 15.0%, but given the wide range of values, its representativeness is questionable.

Figure 15. Sector D: CAPEX as a relative share of operating revenue



Source: NSI, calculations of the authors.

In sector D (energy) there is definitely a trend of decreasing capital expenditure as a relative share (Figure 15). The period starts with a level of 30.9%, which is also the maximum and ends with a level of 5.5%. The minimum is 1.4% (in 2017) and the average is 11.5%. The range between the highest and the lowest value is 29.5 percentage points (Table 3). Due to the very high range in which the share of capital expenditure moves, as well as due to the large difference at the beginning and end of the period, it is difficult to accept the average value of 11.5% as a reliable benchmark for the sector.

Conclusion

In the first part of the broader study by the authors (Nenkov, Hristozov, 2022), it was found that the dynamics of operating expenses largely follow the dynamics of operating revenues. One conclusion then was that historical averages of operating expenses as a percentage of operating revenue can serve as a good starting point in the process of determining future free operating cash flows.

In the context of the current research, for *NOWC and capital expenditure*, things seem a bit more complicated. In the short term, fluctuations in both groups of investment expenditures

are in many cases significant, which casts doubt on the extent to which the derived average values can serve as benchmarks for the respective sectors.

At the same time, however, there are no serious arguments against the fact that *NOWC and capital expenditures* in the long term will follow as average values of at least approximately the *operating revenue*. The fact that the observed period is relatively short, as well as the peculiarities of this period, should not be overlooked. It begins with the years of the global financial crisis and ends with the crisis caused by the COVID-19 pandemic. Regardless of short-term fluctuations, values are generally expected to gravitate around an average over a longer period. The period between the global financial and economic crisis of 2007-2008 and the onset of the crisis caused by COVID-19 is interesting for researchers because it saw recession and periods of economic growth, which were again interrupted by a crisis in 2020 which led to a new global economic downturn in some countries. The COVID-19 crisis is particularly specific with the disrupted logistics connections and the possibility of supplies, which significantly increased the demand and prices of a number of goods and services, the supply of which was not enough to satisfy the needs of businesses and households.

In some of the sectors, the established range of variation of the values is very small. In some cases, this is combined with a horizontal trend in the relative share of NOWC and capital expenditures in the medium term. In such situations, the derived averages are highly representative and could be used as benchmarks. Accordingly, the hypothesis that historical averages for the relative share of NOWC and capital expenditures can be used in forecasting free operating cash flows, is rather confirmed in these cases.

References

Bancel, F., Mittoo, U. (2014). The Gap between the Theory and Practice of Corporate Valuation: Survey of European Experts. – Journal of Applied Corporate Finance, Columbia Business School, Vol. 26, N 4, Fall 2014, pp. 106-117.

Barker, R. (2001). Determining Value – Valuation Models and Financial Statements. Prentice Hall, Pearson Education Limited.

Copeland, T., Koller, T., Murrin, J. (2000). Valuation – Measuring and Managing the Value of Companies. John Wiley & Sons, New York.

Copeland, T., Antikarov, V. (2001). Real Options – A Practicioner's Guide. Texere, New York.

Damodaran, A. (2020). A Viral Market Update III: Pricing or Value? Trading or Investing?, blog post, available at: http://pages.stern.nyu.edu/~adamodar/.

Damodaran, A. (2002). Investment Valuation – Tools and Techniques for Determining the Value of Any Asset". John Wiley & Sons, New York.

Damodaran, A. (2019). The Pricing Game, blog post http://pages.stern.nyu.edu/~adamodar/.

Fernandez, P. (2019). Company Valuation Methods. – IESE Business School, Working Paper, available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=274973.

Fernandez, Pablo, Andrada Bilan, (2007). 110 Common Errors in Company Valuations. – IESE Business School, Working Paper WP No 714, November 2007, Appendix 1, available at: http://ww5w.mandaportal.com/getattachment/f64aac39-d353-4df7-907b-2c54918bbfe1/110-Common-Errors-in-Company-Valuations.

Graham, B. (2006). The Intelligent Investor – Revised Edition. First Collins Business Essentials edition (HarperCollins Publishers), (Preface to the fourth edition by Warren E. Buffett, Updated with New Commentary by Jason Zweig).

Graham, B., Dodd, D., L. (2009). Security Analysis – Principles and Technique. 6th ed. The McGraw-Hill Companies, Inc. (Foreword by Warren Buffett, Updated with New Commentary by Seth. A. Klarman, James Grant, Bruce Greenwald, and Others).

Guevski, I. (2001). Programa i metodika za ocenka na celi predpriyatia, Sofia.

Hitchner, J. (2017). Financial Valuation – Applications and Models. 4th ed. John Wiley & Sons, Inc.
Hristozov, Y. (2021). Liquidity of Non-Financial Corporations: Evidence from Bulgaria. – Economic Alternatives, N 3, pp. 389-406, available at: https://www.unwe.bg/eajournal/en/journalissues/article/21215.
International Valuation Standards Committee. (2001). International Valuation Standards 2001. London, p. 92 (Standard 1).
Koller, T., Goedhart, M., Wessels, D. (2015). Valuation – Measuring and Managing the Value of Companies. 6th edition. John Wiley & Sons.
Moris, Ch. (2009). Madrecite – Warren Buffett. George Sorros i Paul Wolker, Siela.
Nenkov, D. (2005). Ocenka na investiciite v realni aktivi. UI "Stopanstvo", Sofia.
Nenkov, D. (2015). Opredelyane na stoynostta na kompaniite. IK na UNSS, Sofia.
Nenkov, D. (2017). Predpostavki za manipulirane na rezultatite pri ocenkata na dejstvashti predpriyatia. – IDES, N 3.
Nenkov, D., Hristozov, Y. (2022). DCF Valuation: Exploring the Interrelation between Revenue and Operating Expenditures. – Economic Alternatives, N 4, pp. 626-646, available at: https://www.unwe.bg/eajournal/en/journalissues/article/25299.
O'Brien, T. (2003). A Simple and Flexible DCF Valuation Formula. Available at: https://ssrn.com/abstract=253448.
Palepu, K., Healy, P. (2012). Business Analysis & Valuation: Using financial Statement. 5th edition. South-Western Cengage Learning, USA.
Patena, W. (2011). A Coherent Model of DCF Valuation, Journal of Entrepreneurship, Management and Innovation. Available at: http://ssrn.com/abstract=2010583.
Penman, S. (2013). Financial Statement Analysis and Security Valuation. 5th edition. McGraw Hill, New York.
Pinto, J, Henry, E., Robinson, T., Stowe, J. (2010). Equity Asset Valuation. 2nd edition. John Wiley & Sons, Hoboken, New Jersey.
Reilly, F., Brown, K. (2003). Investment Analysis – Portfolio Management. Thomson Learning, USA.
Taseva, G., (2019). Passivity of creditors among non-financial enterprises in Bulgaria. – Economic Studies Journal, N 6, pp. 128-159.
Taseva-Petkova, G. (2021). Determinanti na vazmozhnostta na MSP v Bulgaria za pokrivane na tekushtite im zadalzhenia s parichnia potok ot osnovna dejnost. – Ikonomicheska misal, N 4, pp. 115-125.
The European Group of Valuers' Associations. (2000). European Valuation Standards 2000. 4th edition. TEGOVA and Estates Gazette, London, p. 29 (St.4.07), p. 36 (ref. to IFRS 16.6).
Zukin, J. (1990). Financial Valuation: Businesses and Business Interests. Warren Gorham Lamont.