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A.V. BILYCH, post-graduate student
Vadym Hetman Kiev national economic university

Theoretical and practical aspects of business valuation based on DCF-method (discounted cash flow)

Introduction. At the current stage of the corporate finance development the importance of thorough science-based approach to the selection of the method of valuation of the enterprise is of no doubt, as well as the very necessity of determining the value of the company. Each of the existing theoretical and practical methods is characterized by its own set of financial and economic parameters and analytical showings and require certain information and statistical data to evaluate the company in accordance with the assessment`s objectives and certain conditions of implementation.

The most widely used models among a variety of all business valuation methods are the discounted cash flow models (DCF) namely the method of free cash flow to firm (FCFF) and free cash flow to equity (FCFE). The choice of these methods by theorists and practitioners of investment analysis and corporate finance is more than just obvious, as far as those methods most closely reflect the expectations of investors and other stakeholders on company profitability and growth opportunities. In addition, the DCF method takes into account the time factor that makes the obtained results according to the model a strategic focus that allows potential investors and existing shareholders to make the decision as for the further development of enterprise and their participation in it. One another competitive advantage of the DCF model over other methods is the complexity of its evaluation, which lies in a detailed analysis of operational, financial, investment activity of the

company, analysis of financial statements, research of different markets and other factors influencing the development of the company that are further reflected in the generated cash flows.

Analysis of recent researches and publications. The problematic scope of this research has formed the basis for many scientific works of some famous authors, namely V. Andriychuk [1, 2], R. Andriychuk [1], V. Gusev [4], I. Brodsky [3], A. Damodaran [5], T. Ogier [6], I. Telyatnikov [7], T. Uzst [8], Tufano P. [10], Shannon P. [9] and others.

The purpose of the article – to analyze the theoretical and methodological foundations of the DCF- method, as well as providing reasoned comparative analysis of different approaches to determining the value of the company within the named model (DCF).

Statement of the main results of the study. Two fundamental concepts are laid in the DCF-method - the concept of time value of money and net present value (NPV) theory, according to which the present value of existing enterprise is calculated in future periods, and also the justification of investments is determined (in accordance with the financial benefit and expectations of investors).

Based on the concept of time value of money, DCF-method assumes that any estimated company today or any type of investment being made today in the future will have a different value and purchasing power, which is related to the inflation rate and the expectations of the company`s profitability in terms of existing risks. Thus, for the purposes of company valuation the projected value of future cash

flows (FCF), which is generated at the current moment, is used together with the discount rate or cost of capital, which is taken as the expected yield by investors:

$PV = FV / (1+r)^t$ (according to the concept of time value of money),

$PV\ CF = \sum FCF_t / (1+r)^t$ (according to the DCF-method),

where PV and PV CF – present value of money and present value of cash flows; FV and FCF_t – future value of money and future/expected value of cash flows in t-period; r – discount rate (the weighted average cost of capital – WACC), %; t – projection period.

If the theory of time value of money allows investors to analyze their future benefits, the rule of net present value (NPV) allows them to understand generally the feasibility of investments (project, business, etc.). Thus, NPV reflects the value of discounted future cash flows minus the initial investment (capital investment), the most standard practice of company evaluation under this rule is the use of economic value added (EVA)[1]:

$$NPV = \sum EVA_t / (1+r)^t.$$

According to the NPV concept the only investment that will be worth is the one that during the projected period (discount factor) and based on other risk factors generated the cash flows that are greater than the initial level of investment. Only in this case (the requirement for the maximum net present value of future cash flows) the company will be able to meet its obligations to investors and increase the value of business through stock price growth, to improve investment attractiveness and to strengthen its financial and economic conditions.

Based on these fundamental principles that are laid in the basis of business valuation DCF-method, we arrive to the conclusion that the enterprise value will be the value of expected net cash flows that will generate the business as a result of its operational, economic, financial and other activities taking into account the time factor (time discounting) and different system-

atic and specific risks inherent in the business environment, measured in discount rate (WACC):

Value of firm = $\sum FCFF_t / (1+WACC)^t$,

where $FCFF_t$ – expected free cash flows to firm in t-period; WACC – weighted average cost of capital, %; t – projection period.

Among the complexities of applying the DCF- model in practice, perhaps the greatest is the prediction and measurement of free cash flows (FCF), which are expected to be generated by the company during the period of discounting (t). This deal requires very careful approach to the analysis of operational, financial, investment activities of the company, analysis of different risks faced by the enterprise and thorough research of the company strategy in order to forecast changes in dividend and loan policy, etc. In general, cash flows forecasting takes into consideration:

- period of forecast (the starting point from which depends not only on the accuracy of the calculations and their subsequent volumes, but also the possibility of determining the terminal value (TV), as an integral part of the "post forecasted" company valuation);

- strategic objectives of the enterprise further development (for ex., capabilities and plans for acquisitions or sales of selected subdivisions that will contribute significantly to the cash flow movements, etc.)

- the size of the enterprise (small-sized companies have more opportunities to operational, financial "maneuvers" and higher capacity potential market, but at the same time they face greater risks associated with the lack of benefits from economies of scale, lower competitive ability on small diversified market);

- existing company`s growth rates and its life cycle;

- availability of competitive advantage and the current market share of the company (the sustainable competitive advantage enables the company to maintain a stable position in the market and high growth rates, which will affect all types of business activities - operating, investing, financing, etc.).

In order to measure the potential growth rate of the company`s cash flows during the period of forecast different methods are used. Thus, the most widely used is the method of

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[1] The use of EVA in this case is possible since the calculation takes into account the investor's initial investment as well as expectations of profitability: EVA = NOPAT – CI* CC, where NOPAT – net operating profit after tax; CI - the value of invested capital; CC – cost capital, %.

correlation of previous results (historical data) in accordance with development plans of the company during the projection period (arithmetic or geometric calculations of the value of net, operating income, gross receipts, etc.), also taking into account the impact of exogenous to the company factors (growth rate of the economy, inflation expectations, political and other risks). In addition, these forecasts may be based on information given by managers of the company, but the obtained information will be useful only in the case of its objective grounding. If necessary, the results of these projections can be enhanced by calculations performed by the scenic method, which involves several scenarios - moderate, pessimistic and optimistic (all scenarios based on different assumptions as for the enterprise activity, according to which the values of cash flows under certain growth rates and factors of influence are calculated). In general, the process of measurement and forecasting the expected cash flows is time-consuming and labor-intensive, requiring the full possession of information about current and strategic business situation correlating it with some endogenous and exogenous factors of influence. In the case of the necessity the process of forecasting can be refined by making some detailed forecasts for separate items – capital expenditures, changes in the structure of production, dividend and loan policies, market prices and share quotations, etc.

Depending on the purpose of company valuation two different models are used within the DCF-method, namely FCFF (free cash flow generated by the whole business) and FCFE (free cash flow generated by company`s equity). So, FCFF is more general expression of the cash flows that include both current and non-current liabilities and other credit exposures on the company. This indicator is of more value to existing and potential business investors, as it reflects the cash flows generated by operating activities of the enterprise, and in addition, determines the enforceability of dividend payments to shareholders.

FCFF = EBIT*(1-T) +Depreciation – CAPEX – increase in NCWC,

where EBIT – earnings before interest and income tax; T – the income tax rate, %; CAPEX – capital expenditures; increase in NCWC – increase in other assets (non-cash working capital - inventory, raw materials, semi finished goods etc).

In its turn, FCFE is the manifestation of such cash flows that are available to shareholders (in accordance with the dividend policy), from which the value of all capital expenditures and investments, as well as debt payments and various tax burdens, are deducted:

FCFE = NI – (CAPEX – Depreciation) - increase in NCWC + Debt – Debt repayment,

where NI – net income.

Thus, the value of FCFE can be expressed as follows:
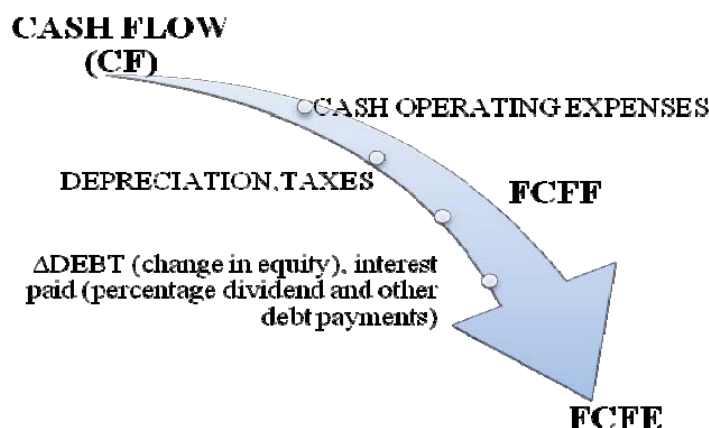
FCFE = FCFF – interest paid + increase in debt.

Fig. 1. The interrelation concept - "CF – FCFF – FCFE"

While valuating the company the structure of its capital should be taken into consideration, because the discount rate used in FCFF or FCFE calculations will vary (the weighted average cost of capital - WACC or cost of own equity – CAPM). So, according to this and taking into account the concept of money over time (the principle of discounted cash flows) the enterprise value is determined as follows:

$V_{firm} = \sum FCFF_t / (1+WACC)^t$ or $V_{equity} = \sum FCFE_t / (1+CE)^t$,

where V_{firm} and V_{equity} – the value of the whole business and the cost of the enterprise according to the value of its own equity; CE – cost of equity,%.

But the results of the business valuation will be incomplete without taking into account the "post forecasted" period that goes beyond the discount period of the valuation. Since the prospect of further development of the company is of special interest for any investor/shareholder or other stakeholder, it's necessary to evaluate the enterprise during this period under the current (given) rate of growth (g – rate of FCFF/FCFE growth). For this purpose the terminal value of business is calculated, which in its essence is analogous to the present value of the future cash flows generated in "post forecasted" period.

The most acceptable practical methods of determining the terminal value are:

- residual value (used when the company or its assets will be liquidated, and therefore the accumulated cash flows in the "post forecasted" period are represented by their book value adjusted to the expected level of inflation or to their "purchasing power", or in other words to the ability of assets to generate a profit);

- the method of a steady growth, which suggests that even in a "post forecasted" period, the company will maintain current growth trends that were observed during the previous period (discount period - t), what expressed as a coefficient g (should not exceed the average long-term projected growth rates in the industry or in the economy of the enterprise). According to this method cash flows will increase at a stable growth rate that can be determined by expert opinion involving competent vision of the company`s management:

$TV_n = \sum FCFF_n (FCFE_n) / WACC$ (or CE) – g,

where TV_n – terminal value at the current period; $FCFF_n$ and $FCFE_n$ – expected free cash flows to firm and to equity accordingly generated during the last year of forecast - n.[1]

So, the formula of the value enterprise calculating is complicated by the calculation of terminal value as an important and integral part of the completed business valuation process. In this case, we receive the results that are an informative and objective reflection of economic conditions of business during both forecasted and "post forecasted" periods:

$V_{firm} = \sum FCFF_t / (1+WACC)^t + TV_n$.

Previously we considered a DCF-model of determining the value of the enterprise with a sustained level of development (within a stable growth rate - g). Since no existing or newly established business is able to maintain constant level of development due to the inherent cyclical nature of its activities (primarily related to the lifecycle of the company or the product of its activity), there is the necessity to develop models which would take into account the following. Thus, the practice of corporate finance suggests several variants:

- two-stage DCF - model (is used in the case when initially the company is growing faster than the average steadily growing enterprise in the industry, but after a period of increasing competitive positions and occupying a specific market niche the company gains a stable growth rate):

$V_{firm} = \sum FCFF_t / (1+WACC_{hg})^t + FCFF_k / (1+WACC_{sg})^k + PV\ TV$,

where $FCFF_t$ and $FCFF_k$ – free cash flows during the period of high and stable growth rates accordingly; $WACC_{hg}$ and $WACC_{sg}$ – weighted average cost of capital during the periods of high and stable growth rates, %; PV TV – present value of the terminal value of the enterprise.

- three-stage DCF - model that is designed specifically for the business, which is experiencing periods of high rates of development,

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[1] In corporate finance it`s a widespread practice to determine TV that is based on FCFF and FCFE in period n (the last forecast period) or n +1 (the next year/period after the forecast period, or the first year of the "post forecasted" period). In fact, this practice depends on the choice of the company.

small decline and afterwards sustainable rate of development:

$$V_{firm} = \sum FCFF_t / (1+WACC_{hg})^t + FCFF_n / (1+WACC_{lg})^n + FCFF_k / (1+WACC_{sg})^k + + PV\ TV,$$

where $FCFF_n$ – free cash flow during the period of low development rate; $WACC_{lg}$ – weighted average cost of capital during the period of low development rate, %.

So, the process of choosing the appropriate business valuation method should be careful and thorough in terms of stages of development of the enterprise and its life cycle, existing competitive advantages and factors of macro- and microeconomic impact on the operating conditions of the company.

Assessing the benefits of different variations of DCF – models we can judge about their high practical significance and statistical data overload, due to the coverage of a wide range of operational, finance and investment activities of the company. The calculations require proper definition of the period of forecast and rates of growth, as well as scientific – reasonable approaches to the company's value of capital (using WACC and CAPM – models). These calculations are also based on the information about actual interests of owners and shareholders and comprehensive analysis of further development strategy (reinvestment rates, capital investment necessary for the planned acquisitions, mergers and diversification of business - product, geographical, etc.). Along with the fact that these aspects are of the greatest practical difficulty, so as an alternative, there are other models, such as the method of APV (adjusted present value) and DDM (dividend discount model), the latter of which is based on expected dividend payments.

According to the DDM the value of the enterprise is estimated as follows:

$$V_{firm} = \sum DPS_t / (1+CC)^t,$$

where DPS_t – expected dividend payments (dividend per share); CC – the cost of equity capital, %.

It`s necessary to note that just as in the DCF-models there is also the possibility to use several "stage-method" in DDM according to the level of economic development of the enterprise. As a business valuation method to a certain extent DDM can be a convenient tool,

which simplifies the calculations because there is no need for the detailed forecasts of changes in capital investments, debt capital, operating and other costs. But at the same time, this method is based on the discounting dividends during the relevant period, what implies forecasts as for the whole bunch of different factors, including cash flows of the company in order to predict its dividend policy. This, in turn, complicates the calculations on the model and makes it nearly impossible to use the model within the corporate finance practice of domestic enterprises. In addition, the DDM can be effective only in the case of company`s transparency and openness of its dividend policy, which should be a public product, but in the real world it is more the exception than the rule.

As for the APV-method, we have to mention, that though it`s a convenient tool for determining the value of business, it has not received significant spread among practitioners of evaluation. The author of the APV-method (Article Myers, 1974) proposed to determine the value of the enterprise as the total value of the cash flows generated by various business activities in several stages:

- definition of the basic value that is generated by operating cash flows, and comprises the value of the enterprise without the market value of its debt. To implement this step, we use free cash flow (FCFF) and cost of capital without leverage[2]:

$$V_{firm} = \sum FCFF_t / (1+CE_u)^t,$$

where CE_u – the cost of equity capital without leverage (unlevered), %.

- determine the value that is created due to using different financial instruments (for ex., the market value of the debt burden, the amount of accrued taxes and the impact of tax shield).

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[2] Elimination of the financial leverage effect (debt to equity ratio) can be done at the stage of determining the value of equity capital under CAPM (capital asset pricing model) while estimating the level of systematic risk (β). Thus, the value of βa (level of systematic risk without financial leverage) is calculated using the following formula: $\beta a = \beta e / (1 + D / E)$, where βe – coefficient of systematic risk with financial leverage (β-equity); D - value of debt capital; E - value of equity. Further calculation is based on $CAPM = Rf + \beta a * (Rm - Rf)$, where Rf – risk-free rate of return (%); (Rm - Rf) - risk premium of the stock market, %; Rm - expected rate of return within company`s securities (%).

The arising debt burden has two directly opposite effects on the business performance. Thus, on the one hand, due to significant exposure a strong tax shield is created which reduces the amount of tax being levied:

Value of tax benefits = T * Debt.

On the other hand, considerable credit load poses a threat to financial stability and autonomy of the enterprise (low coefficient of financial independence), which creates negative credit conditions and risks of bankruptcy to the company.

- determining the value of a possible bankruptcy, which is actually the most problematic point, because there is no single correct approach to assessing the probability of bankruptcy (in practice of large international companies Eurobonds` ratings and the level of default risk are taken as a basis for bankruptcy probability, and additionally industry benchmarking is used, etc.). The cost of bankruptcy is calculated as follows

$$PV\ EBC = B_{probability} * PV\ BC,$$

where PV EBC – present value of the expected bankruptcy of the company (value of expected bankruptcy costs); $B_{probability}$ – bankruptcy probability, %; PV BC – present value of bankruptcy costs (according to the residual value of the company and its assets, etc.).

Thus, the value of the enterprise under APV-method is determined as

$$V_{firm} = \sum FCFF_t\ /\ (1+CE_u)^t\ +\ T\ *\ Debt\ -\ B_{probability} * PV\ BC.$$

Since APV-method includes some elements of the DCF-model (especially on the stage of basic value determination), so we can talk about some interchangeability of these methods. But in practice the APV-method cannot be used fully (mainly because of the last element of the formula), since it`s a really difficult task both theoretically and practically to determine bankruptcy costs and the bankruptcy probability for the enterprise. In addition, the APV-method contains one more disadvantage since it assumes continuity of the enterprise income tax rate (T) and a stable level of growth (g) for both forecasted and "post forecasted" periods, that is practically unlikely, and therefore the results of the calculation can be quite inaccurate.

Conclusions. In practice of corporate investment valuation DCF-model has a widespread practical use, being based on two fundamental concepts - time value of money and the theory of net present value. According to the abovementioned concepts the formula of business value estimation was derived, based on the basic elements: period of discounting (projected period), estimated cash flows and discount rate. The main difficulty in using different variations of the DCF-model (FCFF and FCFE) is on the scope of measuring cash flows that will be generated during the period of discounting. Therefore a comprehensive and detailed evaluation and analysis of historical data of the company in synergy with expert information obtained from managers is proposed to be done in order to build the most objective and accurate predictions of the studied variables. The determination of the terminal value is also one of the fundamental questions of the whole business valuation process, which represents the present value of the company during the "post forecasted" period of its operation, which does not cover the main period during which the enterprise is being valued. In order to consider existing business-related lifecycles it was suggested to use different models within DCF-method according to the stages of the enterprise development. Moreover, as alternative methods for determining the value of the enterprise the APV-model and DDM were considered, which unlike DCF, albeit with substantial theoretical background, have no practical widespread usage because of the complexity of corresponding calculations, the need for specific information, which cannot be available because of the opacity of the domestic business.

So, we emphasize on a high practical relevance of DCF-models, which currently have the largest usage and spreading, namely due to a high statistical information content, the relationship with real factors of operational, financial and investment business activity, receiving its direct reflection in terms of financial and economic efficiency of the company (cash flows, profits, return on investment, reinvestment rates, cost of capital, etc.). In turn, these and other parameters are the elements that form the basis for determining the value of the enterprise, and hence create the foundations for the development of the concept of value-based management within the company.

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***Н.Ф. ЯРЕМЧУК,** аспірант**
**Вінницький національний аграрний університет*

Інформаційне забезпечення обліку та контролю нерухомості

Постановка проблеми. Облік завжди за своїм призначенням забезпечує інформацією процес управління та його апарат, оскільки у широкому розумінні є функцією управління, складовою управлінських відносин. Зміни, що відбуваються в системі обліку, зумовлюють необхідність перегляду його інформаційного забезпечення, зокрема обліку об'єктів нерухомості. Повнота й достовірність інформації впливає на ефективність прийняття управлінських рішень різної категорії користувачів.

Аналіз останніх досліджень і публікацій дає право стверджувати, що питання інформаційного забезпечення обліку й контролю є досить актуальним. Зокрема, цій темі присвячені праці М.І. Бондара [3], В.В. Деречина [5], А.А. Пилипенко [8], О.А. Подолянчук [9], Н.М. Ткаченко [11] та інших

[1,4]. Однак на нинішній час нерухомість є «специфічним» об'єктом обліку й контролю, оскільки від мети її використання залежить формування доходу підприємства. Тому інформаційне забезпечення нерухомості має важливе значення в системі обліку та контролю.

Мета дослідження – висвітлити інформаційне забезпечення обліку й контролю нерухомості в системі управління суб'єкта господарювання.

Виклад основних результатів дослідження. Насамперед відзначимо, що нерухоме майно – це земельні ділянки, а також об'єкти, розташовані на земельній ділянці, переміщення яких є неможливим без їх знецінення та зміни їхнього призначення (будівлі, споруди) [10].

С. Генрі Харисон зазначає, що нерухомість – це земля як фізичний об'єкт і все, що з нею тісно пов'язано (знаходиться на ній) [12].

За визначенням Т.Б. Бердникової, нерухомість – це матеріальна, відчутна «річ», яку