

THE MAIN APPROACHES TO VALUATION OF THE EQUITY CAPITAL OF OIL AND GAS COMPANIES

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Abstract

Subject. This article analyzes the generally accepted approaches to assessing the value of companies on the basis of financial statements data of ExxonMobil, Chevron, ConocoPhillips, Occidental Petroleum, Devon Energy, Anadarko Petroleum, EOG Resources, Apache, Marathon Oil, Imperial Oil, Suncor Energy, Husky Energy, Canadian Natural Resources, Royal Dutch Shell, BP, TOTAL, Eni, Equinor (Statoil), PetroChina, Sinopec, CNOOC, Petrobras, PJSC Gazprom, PJSC NK Rosneft and PJSC LUKOIL for 1999–2018.

Objectives. The article aims to determine the specifics of using the methods of cost, income and comparative approaches in assessing the value of share capital of oil and gas companies.

Methods. For the study, I used the methods of comparative, and financial and economic analyses, and financial reporting data summarizing.

Results. The article finds that the cost approach is quite time-consuming, and it does not take into account the current market situation and future expectations of investors, but is based on financial information. Leading oil and gas corporations have a rather complex vertical and horizontal structure, so the cost approach is acceptable for assessing the minimum cost of small companies in the industry. The income approach takes into account the interests of investors, but its application complicates the reliability of medium-term forecasts for oil prices, which is caused by fluctuations in oil prices inherent in the industry. And the amount of net income and free cash flow in the industry largely depends on oil prices. The comparative approach does not take into account the future interests of investors, but it helps quickly determine the range of possible value of the corporation based on data on transactions and the current market situation. Thus, the analogue company method helps evaluate the cost of equity capital, and the transaction method provides insight into the level of premium for control characteristic of the industry.

Conclusions and Relevance. Each of the standard approaches has its own characteristic advantages and disadvantages when assessing the value of oil and gas companies. The findings can be used to appraise the value of oil and gas assets.

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Introduction

It should be noted that all modern approaches to assessing the value of companies, including oil and gas transnational corporations (TNCs), are divided into three standard types. They are costly, profitable and comparative approaches [1]. Of course, all standard approaches are used in assessing the value of a company in the oil and gas industry, but each of them has a number of its own advantages and disadvantages, and therefore requires a detailed analysis to establish the scope of applicability.

Cost Approach

The cost approach includes the net assets method and the residual value method. The net assets method is based on an analysis of the company's assets and liabilities. The company's assets include fixed assets and intangible assets, calculated at their market value, as well as inventories specified in current prices, accounts receivable, financial investments and prepaid expenses [2]. Net assets are calculated by subtracting from the resulting value of assets the totality of the company's liabilities estimated at their actual value.

Undoubtedly, performing such calculations is a laborious task in the presence of an impressive number of various assets in the structure of the corporation. Any modern large oil and gas company is a good example in this case. So, according to information for 2018, Chevron Corporation had 34 subsidiaries¹, in which the corporation had different shares. The designated subsidiaries are legally located in various US states such as Delaware, New Jersey, Pennsylvania, California and Nevada, and are also scattered around the world. A fairly wide list of countries includes Argentina, Australia, Great Britain, Indonesia, Canada, Nigeria, Thailand, the Philippines, as well as Bermuda and Bahamas.

Of course, the Chevron Corporation does not only do exploration and production in the United States. The list includes 30 countries from different parts of the world. The Chevron Corporation data is eloquent evidence of how complex the task of assessing the market value of all assets of a fairly large company in the industry can be.

Moreover, the method is based on studying only the balance sheet and does not include information on the profitability and generated cash flows of the company, and therefore is more suitable for evaluating a new business. The method does not take into account the forecast data on the subsequent development of the business, as well as its investment attractiveness, which inevitably entails an underestimated value of the valuation at a high profitability of the company.

The residual value method is based on determining the amount of cash that can be obtained upon liquidation of a company with a separate sale of existing assets. This

¹ Form 10-K Annual Report for the Fiscal Year Ended December 31, 2010. Chevron Corporation.
URL: <https://chevroncorp.gcsweb.com/static-files/87b5b33d-4328-494b-afe9-6a0dc01dd556>

method implies the development of a calendar schedule, according to which the liquidation of assets is then carried out. Then the current market value of assets and liabilities is determined. The cost itself is estimated as the amount of assets adjusted for profit or loss of the liquidation period less existing debt and liquidation costs. Thus, this method of valuation is the most appropriate in the event of the termination of the company, but shows the level of valuation below the market value [3].

Income Approach

This approach consists of the income capitalization method and the cash flow discounting method. The income capitalization method is based on calculating the company's value by means of the ratio of net profit to the capitalization rate [4–6]. In turn, other types of company profits and dividends can be used instead of net income.

It turns out that the income capitalization method implies sufficient stability of the position and uniformity of income receipt. The basis for assessing the value in this case is the financial statements of the company. The value of the indicator for the reporting or forecast year, as well as the average value over several years, can be used as capitalized income. The capitalization rate is often determined based on the required rate of return minus the average annual rate of profit growth. This method is suitable for companies that are constantly generating profits, which vary in a relatively narrow range, but this is typical for the oil and gas sector only during periods of a fairly stable level of oil prices.

Of course, there were time periods with a relatively stable level of oil prices in the period from 1999 to 2018 (*Table 1*).

Nevertheless, the duration of these periods did not even reach five years, and the prices themselves varied in a wide range of values. A striking example is the new millennium, when the values of oil prices have increased almost fivefold in the first ten years. The impressive swings in oil prices have had a significant impact on the net income generated by the companies. Undoubtedly, the average value of the net income of the 25 leading publicly traded oil and gas companies covered by the research framework (*Table 2*) is a confirmation of this. Indeed, the net income of publicly traded oil and gas companies varied in a very wide range over the period under study. This circumstance does not allow the use of the income capitalization method, which implies obtaining a stable profit. Moreover, many companies experienced a net loss during the global and industrial crises.

The cash flow discounting method is built on the assessment of the company's potential. The method implies the fulfillment of the forecast of the formation of cash flows in accordance with the assumption that the potential investor will not spend on the purchase an amount higher than the present value of future profit. Undoubtedly, this method is more suitable for evaluating companies that systematically generate profits.

In fact, this method is based on determining the future free cash flow of the company [7]. There are several methods for determining the free cash flow of a company. The indicator

in the most simplified version is defined as the difference between the net cash from operating activities and the company's capital expenditures.

Undoubtedly, net cash from operating activities of the world's leading publicly traded oil and gas corporations (*Table 3*) also depends on oil prices, which manifests itself in favorable and crisis periods for the industry. Consequently, the values themselves for each company varied in a wide range.

The cash flow discounting method includes a number of stages. These include the choice of a cash flow model and the length of the forecast period, analysis and forecast of revenue, expenses and investments. It is required to calculate the cash flow for each year, determine the discount rate and calculate the cost in the post-forecast period. Then it is necessary to calculate the current estimate of future cash flows and the value of the company in the post-forecast period. Undoubtedly, this method of assessing the value of share capital stands out for its labor intensity and complexity.

The methods of the income approach demonstrate a common feature associated with the dependence of the company's valuation on the size and dynamics of oil prices. But then it becomes necessary to reliably predict oil prices for a long time period. A number of recognized organizations publish their own materials, but the most detailed forecast for quotations is provided by the Energy Information Administration of the US Department of Energy (EIA). The materials of the EIA contain a detailed forecast for the monthly average oil price until the end of the current year and for the next calendar year (*Table 4*).

The EIA also produces long-term forecasts of oil prices for various scenarios of economic development, each of which contains a certain set of predetermined indicators. The base case, models of high and low economic growth, high and low oil prices, and high and low levels of raw materials and technologies are considered as the main scenarios analyzed.

The basic version of the scenario includes a whole list of various components reflecting the general trend towards an improvement in economic and demographic indicators and the level of technology development (*Table 5*). Thus, the annual growth of US GDP is projected at 1.9% until 2050. The annual increase in US GDP in scenarios with high and low economic growth is estimated at 2.4% and 1.4%, respectively. The scenario with a high level of raw materials and technologies assumes more significant unproved oil and gas reserves and a lower cost of their production compared to the base case, while the scenario with a low level of raw materials and technologies implies changes in the opposite direction. The high oil price scenario takes into account the impact of higher global demand for petroleum products, as well as reduced investment in exploration, development and production in OPEC countries and higher exploration and development costs in non-OPEC countries. It is quite logical that the scenario of low oil prices reflects the development of the situation with opposite trends.

It turns out that the change in supply and demand for petroleum products according to the EIA is capable of expanding the range of possible oil prices to those limits when the boundary values differ by several times in their value. It turns out that it is not possible to predict quotations with high accuracy in the medium term. At the same time, the most significant period is precisely the first decade when determining the value of a company using the cash flow discounting method. In addition, a wide range of projections will lead to large discrepancies in the valuation of equity for different oil price scenarios.

Comparative Approach

The comparative approach to assessing equity capital is based on three main methods. These are the analogue company method, the transaction method and the industry formulas method.

The analogue company method is used to determine the possible value of over-the-counter corporations and is based on information on trading in shares of similar size and scope of publicly traded companies. The method is based on the choice of an analogous company, financial analysis and comparison, the calculation of multipliers and the calculation of the final cost [8]. It should be noted that an analogue is selected by comparing a number of indicators, which include the size and structure of the company, country affiliation, financial results, strategy and stage of development, types, volumes and quality characteristics of products.

The multipliers used within the framework of this method express the ratios of various stock market, financial and operating indicators of the analogous company. Often, the numerator is the value of market capitalization or the value of the enterprise, which differs from the previous indicator by the amount of net debt. The denominators are indicators such as net income, revenues, assets, equity, EBITDA, DCF, as well as data on production, refining and proved reserves.

In addition, a specific coefficient is applied that shows the ratio of the stock market price of an ordinary share to its share in net income. However, there are also companies in the industry that have quoted preferred shares in their capital. Among them are Petrobras, Husky Energy, PJSC Surgutneftegas and PJSC ANK Bashneft. Although there are few such companies in the industry, it is necessary to take this feature into account when assessing and apply the ratios of the ratio of market capitalization or company value to net profit of shareholders instead of the specified multiplier, if necessary.

Moreover, it is required to pay close attention to determining the size of the market capitalization. All types of tradable common shares should also be considered in addition to the need to include listed preferred shares in the calculation. The share price is understood as the quotation of the close of trading on the date of interest or the previous trading session due to an interruption in the functioning of the exchange. Another component is a quantitative indicator. It should be noted that the number of shares

outstanding is used when calculating the market capitalization of the company. The number of shares outstanding is calculated as the difference between the number of issued and repurchased treasury shares for all types of quoted shares. It is also important to correctly bring all indicators to a single currency, which is often the US dollar. Indeed, companies such as PetroChina, Royal Dutch Shell and Sinopec trade their shares not only on different exchanges, but also in different currencies. It is advisable to use the rates of central banks or the data of the closing of trading on large exchanges for currency pairs on the required date in such cases, and information on depositary receipts for shares is a completely acceptable alternative to them.

Of course, the market capitalization of any publicly traded company is seriously affected by the level of debt burden. Therefore, it is better to use an indicator of enterprise value instead of market capitalization for the assessment when there is a noticeable difference in the ratio of total debt in total capital between the assessed corporation and a similar company. The enterprise value allows us to largely neutralize the influence of the debt component.

It is worth noting that the main multiples are based on assets and equity. In addition, one should try to refrain from evaluating the value using indicators based on EBITDA, DACF, and even more so, net income during periods of crisis for the oil and gas industry.

It is also important that only a minority stake in the company is assessed in this way, while calculating the value of the controlling stake requires an amendment in the form of a control premium. Nevertheless, the analogue company method makes it possible to quickly estimate the value of an over-the-counter company with similar parameters based on stock market, financial and operational indicators.

The transaction method is very similar in principle to the previous method. The key difference lies in the fact that the source for the assessment is information about previously concluded transactions for the acquisition of controlling stakes or entire companies, which do not take into account the current state of affairs in the market. Meanwhile, the method makes it possible to estimate the level of the control premium inherent in the industry in relation to the current market value of the company [9]. It turns out that the combined use of the analogue company method and the transaction method makes it possible to give a more accurate estimate of the value of the share capital.

The industry formulas method is to use the recommended multipliers of the ratio of prices to certain components of the company's financial statements [10]. Such factors for the industry are determined by specialized analytical services based on statistical data from research over a long period of time. It should be emphasized that the use of industry standard indicators significantly speeds up the assessment process. Of course, the method under consideration in determining the value is used as an auxiliary tool due to the approximate nature of the assessment.

Conclusions

It turns out that each of the standard approaches used to assess the possible value of corporations in the oil and gas industry has its own characteristic advantages and disadvantages. Thus, the cost-based approach is quite laborious, it does not take into account the current market situation and investors' expectations for profitability according to the results of the study. But the approach is based on reliable financial information, and therefore it is quite acceptable for assessing the minimum value of small companies in the industry. Undoubtedly, the cost approach cannot be used as a tool common to all oil and gas companies, since many of them have a rather complex structure with horizontal and vertical integration.

Meanwhile, the income approach takes into account the interests of investors, but is not based on available data on oil prices and is difficult to calculate. However, the main difficulty is associated with the reliability of medium-term forecasts for oil prices, which is confirmed by significant fluctuations in oil prices since the beginning of this century. And the amount of net income and free cash flow in the industry largely depends on oil prices. Consequently, it is rather difficult to estimate the possible value of oil and gas companies using the income capitalization method and the discounting cash flows method in a rather narrow confidence interval.

In this case, it is required to highlight a comparative approach from the standpoint of evaluating companies in relation to the oil and gas industry. Of course, it does not take into account the interests of investors in terms of profitability, but it allows you to quickly determine the range of the possible value of the corporation based on data on already concluded transactions and the current market situation. Indeed, the analogue company method provides an opportunity to estimate the present value of share capital, while the transaction method provides an idea of the additional amount that the investor will also have to pay to shareholders due to the presence of the industry-specific level of control premium.

Table 1

The average price for WTI and Brent crude oil for 1999–2018, USD per barrel

1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
19.34	30.38	25.98	26.18	31.08	41.51	56.64	66.05	72.34	99.67
2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
61.95	79.48	94.88	94.05	97.98	93.17	48.66	43.29	50.80	65.23

Source: Authoring, based on the U.S. Energy Information Administration data. URL: <https://www.eia.gov>

Table 2

Average net income of the twenty five leading publicly oil and gas companies for 1999–2018, million USD

31.12. 1999	31.12. 2000	31.12. 2001	31.12. 2002	31.12. 2003	31.12. 2004	31.12. 2005	31.12. 2006	31.12. 2007	31.12. 2008
1,430	3,991	2,973	2,467	4,589	6,391	8,811	10,463	11,713	10,015
31.12. 2009	31.12. 2010	31.12. 2011	31.12. 2012	31.12. 2013	31.12. 2014	31.12. 2015	31.12. 2016	31.12. 2017	31.12. 2018
7,099	9,658	13,284	11,472	10,528	5,534	-1,394	1,049	4,268	7,205

Source: Authoring, based on [5, 6]

Table 3

Average net cash flow from operating activities of the twenty five leading publicly traded oil and gas companies for 1999–2018, million USD

31.12. 1999	31.12. 2000	31.12. 2001	31.12. 2002	31.12. 2003	31.12. 2004	31.12. 2005	31.12. 2006	31.12. 2007	31.12. 2008
3,195	5,647	5,929	5,762	7,628	9,467	11,885	13,897	16,070	18,510
31.12. 2009	31.12. 2010	31.12. 2011	31.12. 2012	31.12. 2013	31.12. 2014	31.12. 2015	31.12. 2016	31.12. 2017	31.12. 2018
13,456	17,575	20,367	19,954	20,647	20,814	14,402	11,312	14,661	17,914

Source: Authoring, based on [5, 6]

Table 4

EIA forecast for WTI crude oil price for November 2019–December 2020, USD per barrel

Parameter	November, 2019	December, 2019	January, 2020	February, 2020	March, 2020	April, 2020	May, 2020
Monthly average price forecast	55.50	54.50	53.50	52.50	52.50	51.50	50.50
Price of oil futures on the NYMEX Exchange	–	–	56.74	56.58	56.25	55.87	55.46
Lower confidence interval at 95% probability	–	–	46.78	43.92	41.22	39.13	37.32
Upper confidence interval at 95% probability	–	–	68.81	72.89	76.77	79.77	82.43
Parameter	June, 2020	July, 2020	August, 2020	September, 2020	October, 2020	November, 2020	December, 2020
Monthly average price forecast	52.50	54.50	55.50	53.90	57.50	58.50	59.50
Price of oil futures on the NYMEX Exchange	55.04	54.63	54.24	53.90	53.62	58.50	53.20
Lower confidence interval at 95% probability	35.86	34.43	–	32.57	–	–	30.48
Upper confidence interval at 95% probability	84.48	86.66	–	89.22	–	–	92.85

Source: Authoring, based on the U.S. Energy Information Administration data. URL: <https://www.eia.gov>

Table 5**EIA forecast for the WTI crude oil price for 2020 – 2050, USD per barrel**

Indicator	2020	2025	2030	2035	2040	2045	2050
Basic variant	69.72	77.92	87.34	95.20	100.18	103.53	104.52
High economic growth	69.70	78.14	87.87	96.02	101.90	106.16	108.65
Low economic growth	69.26	76.46	86.46	93.37	98.14	100.73	100.93
High level of raw materials and technologies	66.93	72.50	78.45	83.64	86.96	88.16	88.08
Low level of raw materials and technologies	71.72	84.49	96.78	108.11	116.86	120.08	119.41
High oil prices	117.51	148.65	170.55	183.34	191.75	199.95	208.11
Low oil prices	40.86	42.39	42.88	46.07	46.66	48.21	49.71

Source: Authoring, based on the U.S. Energy Information Administration data. URL: <https://www.eia.gov>

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