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INTRINSIC VALUE OF STOCKS OF "BIG OIL" COMPANIES

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ABSTRACT

This research investigates the intrinsic value of stocks of companies within the oil extraction sector. The focus is on publicly traded corporations part of "Big Oil": ExxonMobil Corporation, Chevron Corporation, TotalEnergies SE, BP plc, Shell plc, and ENI S.p.A. The numerous fundamental analysis intrinsic value of stocks models is being applied to the Big Oil consortium. This article stands out for its unique focus on utilizing dividend discount models, earnings models, and cash flow models to calculate the intrinsic value of stocks in major oil companies, which is currently missing in existing studies as of April 2024. Through this approach, it not only forecasts stock prices but also provides investment recommendations, offering fresh insights into stock evaluation and uncovering potential investment prospects within these companies according to intrinsic value of stocks. Specific mathematical models for the intrinsic value of stocks are applied to each examined company for this calculation. The intrinsic value of stocks in companies recommended for investment was found to be undervalued by 7.25% for dividend discount models, 8.25% for earnings models, and 36.75% for cash flow models compared to their current market values. The assessment of intrinsic value of stocks reveals the suitability of investing in these companies: TotalEnergies SE, BP plc, Shell plc, ENI S.p.A. These results offer valuable insights for stock investors in the oil sector, as well as organizations under investigation and other stakeholders in the oil extraction industry.

Key words: Cash flow models; Discount models; Earning models; Intrinsic value; Stocks.

1 INTRODUCTION

As a commodity with the biggest impact on the world, crude oil not only occupies a very important proportion in the global trade, but also is closely related to the politics and economy of all countries in the world [1, 2, 3].

Oil serves as the primary energy source for the global market, constituting 3% of global economy. Its consumption is closely tied to the level of economic activity. The intrinsic value of stocks proves to be a suitable tool for a comprehensive examination of this matter [4].

The importance and relevance of oil for the world economy play a key role in the way the oil industry and individual companies are viewed. Leaving aside the primary role of oil companies, given their importance, these companies can also be an interesting investment opportunity.

An investor's decision to make a long-term (value) investment should be supported by fundamental analysis. Fundamental analysis is one of the most comprehensive methods of comparing the future profitability of a stock.

Fundamental analysis is defined as a method aimed at analysing current and past financial statements in conjunction with other company specifics. From an investor's perspective, we use fundamental analysis of the stock market to look for the potential to make a profit through undervalued or overvalued stocks, which we can then turn into profit through the right trading system. The aim is to find the intrinsic (correct) value of a stock [1, 5].

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This paper focusses on fundamental analysis, specifically on calculating the intrinsic value of stocks of companies that are that are part of the group “Big Oil”'. The group “Big Oil” consists of ExxonMobil, Chevron, TotalEnergies, BP, Shell, ENI.

Many theorists and practitioners focus on the issue of investing. Many studies have been conducted on the theoretical and empirical aspects of valuation and stock analysis.

Authors of scientific publications commonly write about the attempt to reach better stock valuation models using the fundamental analysis approach [6], or about the influence of stocks' intrinsic valuation on investment decision making [7] and other theoretical aspects of fundamental analysis, and why it is advisable to follow it for investment decision-making.

This article is distinctive in that it focuses on the practical calculation of the intrinsic value of stocks in Big Oil companies using dividend discount models, earnings models and cash flow models. There is no study currently available as of April 2024 applying these formulas for calculating the intrinsic value of stocks specifically within the Big Oil’ group.

However, we can observe studies dealing with the issue of oil prices in relation to their stocks [8]. A similar correlation is described by [9], which concluded that if the price of oil rises, so does the price of company stocks.

Authors [10] created study examining the impacts and interrelations among oil, stock markets, gold, and dollars based on global market data. They concluded that oil prices are significantly influenced by stock markets, gold, and the dollar, with indirect effects, confirming the existence of correlations within the global market.

Authors of study [11] directly calculate stocks prices prediction in the oil industry using an LSTM model.

About influencing intrinsic value of stocks on its market price we can find study [12], where results show that the intrinsic value conclusion has a significant positive effect on stock market prices prediction. Other studies writing about problematics of intrinsic value and relevant investment decision-making are: Intrinsic value estimates and its accuracy [13], Intrinsic value of construction stocks: Empirical evidence from the price earning models [14], Intrinsic value in assessing the fairness of its stock price using fundamental analysis [15].

Firm analysis and its intrinsic stock value presents itself as an appropriate method for predicting stock prices and offering investment recommendations to potential investors, as research with current data has not yet been conducted for “Big Oil”.

In the past decade, oil companies have not done particularly well compared to other major corporations, despite the ups and downs of recent years. This is increased by the current global focus on transitioning away from fossil fuels, which introduces difficulties and challenges in investment decisions within this industry. However, it is noteworthy that oil companies have consistently reported significant profits, amounting to hundreds of billions of dollars. This presents an interesting research problem, highlighting a calculation of intrinsic value of the oil company stocks.

The aim of the study is to calculate intrinsic value of stocks using several formulas of dividend discount models, earnings models and cash flow models applied on companies part of “Big Oil”.

The selected companies are major players in the oil industry, and the analysis seeks to provide insights into their performance and potential investment opportunities. Calculated intrinsic value of the stock is compared with the actual market value, thereby determining whether it is undervalued or overvalued. The conclusion suggests potential investment opportunities in oil company stocks determined by their intrinsic value. Additionally, the study examines how fundamental analysis identifies undervalued stocks and minimises risks while maximizing investment potential in the dynamic landscape of the oil industry.

These research results provide insights for investors engaged in stock markets within the oil sector. Moreover, organizations under investigation, as well as other interested parties in the realm of oil extraction industry, may find this study beneficial.

This study brings new insights into the evaluation of intrinsic stock values and identifies investment opportunities within these companies' stocks. Specifically, it focuses on the application of various models, such as dividend discount models, earnings models, and cash flow models, providing a comprehensive view of stock value.

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2 METHODOLOGY

Fundamental analysis and its intrinsic value of stocks, are considered by the most complex method for predicting future stock prices, plays a key role in the investment process. When applying fundamental analysis, it uses various mathematical models to determine the intrinsic value of a stock, supporting in the identification of future lucrative investments [16].

Intrinsic value, in particular, strives to support the forecasting of long-term market trends. Typically applied for prolonged investments, it provides insights into determining the anticipated stock prices. Furthermore, it streamlines the identification of promising investment opportunities, particularly in this case of selected oil companies [17].

According to research [18], which identified a significant prevalence of fundamental analysis among investors, with 75% actively incorporating it into their strategies. Regression analysis confirmed a statistically significant positive correlation between the application of fundamental analysis and investment success.

The companies subject to study in this research are publicly traded corporations “Big Oil” describing the world's six largest and most influential publicly-traded oil and natural gas producers. The term “Big Oil” encompasses ExxonMobil, Chevron, TotalEnergies, BP, Shell, and ENI. This group traces its origins back to the historically significant Seven Sisters, which wielded control over the majority of the world's known oil reserves, consequently dominating the petroleum market during the mid-20th century. Following multiple mergers, the Seven Sisters now constitute four of the six major Big Oil companies, emerging as some of the largest entities globally. State-owned counterparts to Big Oil include prominent oil and gas producers like Gazprom in Russia, Saudi Aramco in Saudi Arabia, and Sinopec in China [19].

Big Oil represents a suitable sample for investment into firms that are the largest in the oil industry. Especially in the United States, their strong economic influence on politics stands out [19]. Additionally, the United States has the largest stock exchange for trading stocks (NYSE) [20]. Oil industry stocks serve as a good portfolio diversifier, if one of your investments loses value, oil can still provide positive returns, serving as a source of passive income [21]. Moreover, according to [22] published 7th February 2024, Big Oil companies are distributing more money to shareholders than ever before. Big Oil companies have a long-standing tradition in the dynamic oil sector with reliable financial statements, offering lucrative investment opportunities.

The conclusion for corporate fundamental analysis is based on the intrinsic value of the stocks. This area of research focuses on calculating the intrinsic value of the stock according to relevant literature [23] and [24]. The calculation was conducted based on the Dividend Discount Models (DDM), Earnings Models (EM), and Cash Flow Models (CFM), which are also outlined in the introduction chapter, with their relationships described in tables 1-3.

DDM formulas are the methods that attempt to calculate the intrinsic value of a stock regardless of prevailing market conditions, considering factors such as dividend payouts and expected market returns. The models are based on the theory that the value of a company is the present value of the sum of all its future dividend payouts [23]. The theory of EM in fundamental analysis focuses on determining a company's intrinsic value by analysing its future earnings and cash flows. CFM focuses on determining a company's intrinsic value by analysing its future cash flows. This approach assumes that a stock's value is equal to the present value of all expected future cash flows, taking into account factors such as growth potential and risk.

Calculating the stock's intrinsic value involves the following formulas:

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Table 1. *Formulas – Dividend Discount Models*

Dividend discount model with zero growth (1):	$VHa = \frac{D0}{rd}$
Single-stage dividend discount model with infinite holding period (2):	$VHa = \frac{D0 * (1+g)}{(1+rd)} + \frac{D0 * (1+g)^2}{(1+rd)^2} + \cdots . + \frac{D0 * (1+g)^n}{(1+rd)^n}$
Gordons dividend discount model (3):	$VHa = \frac{D0 * (1+g)}{(1+rd)}$

Source: own processing based on [23]
VHa - intrinsic value of stocks
D0 - discount rate (required rate of return)
rd - discount rate (required constant rate of return)
g - expected annual earnings growth rate per share [23]

Table 2. *Formulas – Earning Models*

Zero growth earning model (4):	$VHa = E0 * \frac{VP0}{rd}$
Constant growth earning model (5):	$VHa = E1 * \frac{VPf}{(rd-g)}$
Earning model focused on financial metrics (6):	$VHa = PE * (1+rd) * \frac{NP}{NS}$

Source: own processing based on [23]

VHa - intrinsic value of stocks
E0 - net annual earnings per share in the initial year
VP0 - dividend payout ratio = D0 / E0
rd - discount rate (required constant rate of return)
E1 - net annual earnings per share in the future year
VPf - fixed dividend payout ratio in individual years (f = t = 0, 1, …n)
g - expected annual earnings growth rate per share
PE - price-to-earnings ratio
NP - net profit
NS – number of shares issued [23]

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Table 3. *Formulas – Cash Flow Models*

Free cash flow to equity (FCFE) (7):	$VHa = \frac{\frac{FCFE1}{k - gFCFE} + \frac{Rd * D1 * T}{rb} - L}{number\ of\ shares\ issued}$
Single stage model with constant growth (8):	$VHa = \frac{\frac{FCFE1}{GFCFE - k}}{NS}$

Source: own processing based on [24]

VHa - intrinsic value of stocks
L - total liabilities
Rd - interest costs on debt
D1 = L - total liabilities in the first year
T - Company tax rate
Rb - borrowing interest rate
FCFE1 - expected free cash flow to equity in the following year
k - required rate of return
GFCFE - FCFE growth rate
NS – number of issued shares [24]

By calculating individual formulas, we obtained the intrinsic value of the stock for each company and each formula. Subsequently, the average of the results of individual formulas within each area (DDM, EM, CFM) is determined.

Result area average of the (DDM, EM, CFM) formula is compared with the current price of the company's shares as of January 31, and the percentage difference between the intrinsic value of the stock and its current price is established. If the result is below 1.00, it indicates overvaluation; conversely, undervaluation. The further the result deviates from the value of 1.00 upwards, the more positive the result.

The results of each group of formulas, DDM, EM, CFM, are argued as to whether the result is positive or negative, and why, along with subsequent explanations of input values such as the discount rate. Investment recommendations are made based on the weighted average of the individual arithmetic averages of the results of groups of formulas (DDM, EA, CFM), where CFM models are assigned a weight of 66.66%, as they contain one less formula from this group, whereas the others contain 3 models.

The result of the weighted average is also compared with the current market price of the shares and the percentage difference from this value is determined, with the same significance as mentioned above.

The ranking of oil companies, the subject of potential investment, is compiled based on the result of the weighted average of all groups of formulas and their percentage difference, where the highest value signifies the most positive investment opportunity. If the intrinsic value of the stock is undervalued, then it is recommended to invest. The resulting ranking of companies based on the intrinsic value of stocks also serves as a comparison among the companies.

The data for calculating the intrinsic value of the stock was obtained from publicly available sources, specifically from the financial reports section and investor relations information on the websites of the tracked companies and [25], [26], [27], current to 31.12.2023. These data encompassed information such as the current stock price, dividend yield, EBITDA for the last 12 months, net income, number of outstanding shares, debt level, and cash flow. All the mentioned metrics were expressed in dollars as this currency is typically traded on the markets where these companies are traded.

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3 RESULTS AND DISCUSSION

Table 4. Calculation of the intrinsic value of stocks using Dividend Discount Models (DDM)

Company	Stock price 31.1.2024 (USD)	DDM with zero growth (USD)	S-S DDM with infinite holding period (USD)	Gordons DDM (USD)	DDM average (USD)	Difference (%)
ExxonMobil	102,81	74,40	103,88	96,72	91,67	0,85
Chevron	147,43	123,20	152,22	160,16	145,19	0,94
TotalEnergies	65,18	64,36	69,25	83,66	72,42	1,06
BP	35,1	34,10	37,18	44,34	38,54	1,05
Shell	62,91	51,74	64,79	67,26	61,26	0,93
ENI	31,94	38,90	35,39	50,57	41,62	1,25

Source: own processing based on DDM formulas results

According to study [28] dividend models provide a systematic and analytical approach to evaluating stock value and enable investors to make rational decisions based on estimated intrinsic value compared to market price. Table 4 illustrates the intrinsic value of stocks calculated using the dividend discount models. To compute, we require the anticipated yield rate, at the commencement of the investment, typically considered realistic and satisfactory at 10%, as employed during calculation here [29]. The expected annual stock profit rate in the DDM calculation is set to exceed the predicted inflation in relevant zones such as EU [30] and USA [49] for the subsequent year, based on companies' stock growth statistics [31], namely 5.5%.

By averaging the dividend discount models (Table 4), and comparing them with the current stock prices, the most undervalued stocks are observed in ENI, with a deviation of 25%. TotalEnergies and BP also have undervalued stocks, but their DDM averages significantly less than ENI at 6% and 5%, respectively. ExxonMobil, Chevron, and Shell have stocks overvalued according to the DDM formulas averages, with ExxonMobil showing the highest overvaluation at 15%.

Dividend Discount Models, in their calculation, are primarily influenced by the level of dividends of individual companies, thus the dividend policy of a company impacts the result, depending on shareholders' preferences, which falls within the purview of the general meeting. Companies like ExxonMobil, Shell and Chevron have the highest price-to-dividend ratio, meaning the dividend yield per invested dollar is lowest for them, affecting the outcomes of these models and indicating that these stocks are overvalued.

The findings indicate that DDM provide a valuable method for assessing stock value by comparing intrinsic values to current market prices. The analysis reveals that ENI stocks are significantly undervalued by 25%, while TotalEnergies and BP show less undervaluation, and ExxonMobil, Chevron, and Shell are overvalued, highlighting potential investment opportunities and risks.

Table 5. *Calculation of the intrinsic value of a stock using Earning Models (EM*

Company	Stock price 31.1.2024 (USD)	Zero growth earning model (USD)	Constant growth earning model (USD)	earning model focused on financial metrics (USD)	EM average (USD)	Difference (%)
ExxonMobil	102,81	74,4	87,21	113,09	97,77	0,89
Chevron	147,43	123,2	144,42	162,17	153,53	0,97
TotalEnergies	65,18	64,36	75,44	71,70	75,86	1,08
BP	35,1	34,10	39,98	38,61	40,41	1,07
Shell	62,91	51,74	60,65	69,20	64,84	0,96
ENI	31,94	38,90	45,60	31,94	42,05	1,22

Source: own processing based on EM formulas results

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Table 5 presents the intrinsic value of stocks computed using the earning models. The yield rate is set in the same manner as in the case of the DDM, as shown in Table 4, with the same rate of 10% also in the EM, and the required stock yield also at 5.5% [29], which has similar rationales for its arrangement as illustrated in Table 4. The results of the earning models indicate a similar trend to those of the DDM, as shown in Table 4. By averaging the three earning models, we observe that ENI has the most undervalued stocks, this time with an undervaluation of 22% compared to the current stock price.

Table 5 shows that TotalEnergies and BP have stocks more undervalued according to the earning models compared to the dividend discount models, at 8% and 7%, respectively. Chevron and Shell have stocks priced almost accurately, with a 3% and 4% overvaluation. ExxonMobil's stocks are clearly overvalued, with its stocks using the earning models calculation expected to be offered at 11% lower than their current price.

Earning models are primarily influenced by EBITDA12, number of issued stocks and the level of dividends, which we have already addressed in the DDM. EBITDA12 is primarily affected by deflation in the economy, changes in laws and regulations, competitive pressures from rivals, movements in market prices of goods and services, and changes in consumer preferences. However, all companies are influenced by these variables. Earning models are linked to EBITDA12, the number of issued shares, and the dividends. If undesirable outcomes are achieved, such as in the cases of ExxonMobil, Chevron, and Shell, the stocks will be overvalued according to the calculation of their intrinsic value [32].

The earnings models reveal inconsistencies in stock valuations, highlighting the importance of using multiple metrics for a comprehensive analysis. Integrating these metrics allows for more accurate adjustments and verification of results, strengthening the reliability of fundamental analysis in investing field.

Table 6. *Calculation of the intrinsic value of a stock using Cash Flow Models (CFM)*

Company	Stock price 31.1.2024 (USD)	Free cash flow to equity (USD)	Single stage model with const. growth (USD)	CFM average (USD)	Difference (%)
ExxonMobil	102,81	74	106	90	0,88
Chevron	147,43	67	108	87	0,59
TotalEnergies	65,18	65	120	93	1,42
BP	35,1	26	79	52	1,49
Shell	62,91	68	119	94	1,49
ENI	31,94	13	55	34	1,07

Source: own processing based on CFM formulas results

Table 6 presents the calculation of the intrinsic value of the stocks using two different cash flow models. Their average allows us to observe the difference between the intrinsic value of the stocks and their current stock price. The assumed annual cash flow growth is determined based on the company's real and historical data at a rate of 2% [5]. The required rate of return is set the same as in the previous intrinsic value of stock models at 10% [5].

Cash flow models are primarily influenced by the size of Free Cash Flow to Equity (FCFE), which represents the cash available to equity investors after accounting for all expenses, investments, and debt payments [34].

Compared to DDM (Table 4) and EM (Table 5), companies exhibit greater under- or over-pricing. Over 40% undervaluations in the intrinsic stock price calculation via the cash flow model (Table 6) is observed in Shell, BP, and TotalEnergies, with 49%, 49%, and 42% respectively above the value of their current stock prices. The opposite extreme is reached by Chevron, where its stocks should theoretically be offered 41% lower if correctly valued. Smaller differences in the calculation of the intrinsic stock value are seen in ExxonMobil, which has overvalued stocks by 12%, and ENI, which has undervalued stocks by 7%.

Cash flow models for fundamental analysis depend on several key factors. These factors include the reliability of input data, the specific financial metrics, and the economic and industry context. The input data are drawn from

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31.1.2024. The specific financial metric mainly affecting this model is FCFE mentioned above. The economic and industry context refers to some of the major cash reserve companies in the world within the dynamic oil industry sector.

Table 7. *Summary of intrinsic value of stocks*

Company	Stock price 31.1.2024 (USD)	DDM (USD)	EM (USD)	CFM (USD)	Average (USD)	Difference (%)
ExxonMobil	102,81	91,67	97,77	90	93,54	0,91
Chevron	147,43	145,19	153,53	87	133,77	0,91
TotalEnergies	65,18	72,42	75,86	93	78,85	1,21
BP	35,1	38,54	40,41	52	42,61	1,21
Shell	62,91	61,26	64,84	94	70,77	1,13
ENI	31,94	41,62	42,05	34	39,88	1,25

Source: own processing based on all formulas results

Table 7 displays the calculation summary of the intrinsic value of stocks for dividend discount models, earnings models, and cash flow models, using the methodology described in detail in the methodology chapter.

Companies ENI, TotalEnergies, BP, and Shell are found, based on results in Table 7, to have undervalued stocks, presenting lucrative opportunities for investors. Given these findings and other insights regarding intrinsic stock value revealed by the study, these companies are deemed suitable for investment opportunities. However, investors should be mindful of the associated risks and recognizing that fundamental analysis is typically employed for long-term investments spanning four years or more. ENI stands out with the most-undervalued stocks by 25%, closely followed by TotalEnergies and BP at 21% each, while Shell lags behind with a still positive but lower result of 13% undervaluation. On the other hand, ExxonMobil and Chevron have overvalued stocks by 9% each, based on these formulas relative to their current stock prices, making them unfavourable for investment.

Table 7 shows that the DDM and EM models yielded similar results of the selected companies, consistently indicating overvalued stocks for some and undervalued stocks for others. These models are linked to similar metrics such as dividend yield, EBITDA12, number of issued shares, and current stock price, among others. However, cash flow models provided different insights, necessitating their inclusion in the analysis. Cash flow models primarily rely on FCFE, which for Chevron and ExxonMobil also shows less positive values compared to other companies. Nevertheless, it is noteworthy that Shell, for example, exhibited slight overvaluation in DDM and EM, yet cash flow models indicated significant undervaluation of its stocks, making it a suitable investment option due to its above-average FCFE performance. ENI had the most undervalued stocks among all companies in both DDM (Table 4) and EM (Table 5), but not in CFM, and its average results approached those of other recommended investments. Nonetheless, ENI's stocks remain the most undervalued overall.

Figure 1 provides a graphical illustration of the comparison between the intrinsic value of stocks and their current market value, thus explaining which companies are recommended for investment based on undervalued stocks, as revealed by this study.

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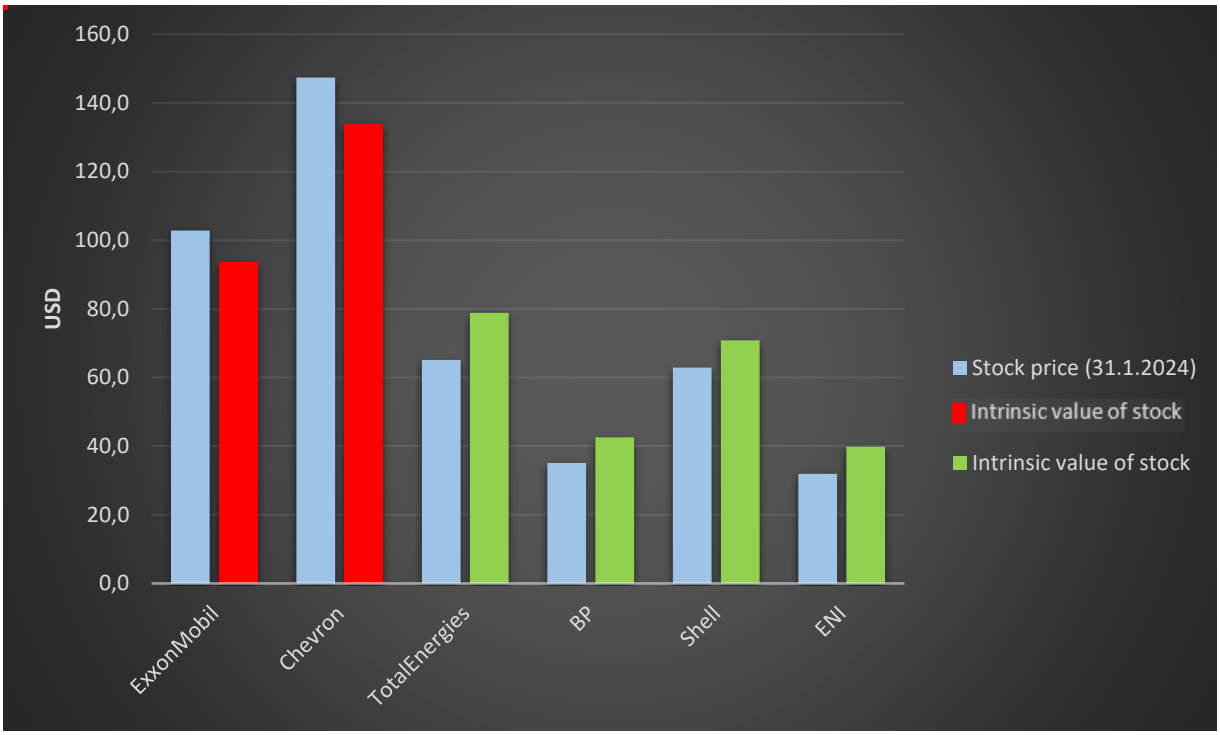

Figure 1. *Comparison of intrinsic value of stocks to its stocks price*
Source: own processing based on average of intrinsic value of stocks results

4 CONCLUSION

Several studies have explored theoretical and empirical aspects of stock valuation and analysis, with researchers commonly refining stock valuation models using fundamental analysis and emphasizing the significance of intrinsic valuation in investment decision-making. In light of these findings, this study successfully conducted a practical calculation of the intrinsic stock values of "Big Oil" using current data, which was the primary objective of the study.

This study's contribution lies in its practical calculation of intrinsic stock values for prominent "Big Oil" companies. By offering a comprehensive summary of intrinsic value calculations through dividend discount models, earnings models, and cash flow models, the research provides valuable insights for investors seeking opportunities in the oil sector. Specifically, the identification of undervalued stocks, such as ENI 25%, TotalEnergies 21%, BP 21%, and Shell 13%, presents lucrative investment prospects for individuals or entities looking to capitalize on potential growth and favourable valuation metrics. Consequently, the study serves as a valuable resource for investors, financial analysts, and decision makers, helping them to make informed investment decisions based on fundamental analysis principles.

The recommendations of study are established on basis on the professional literature and practical results of DDM, EM and CFM. Fundamental analysis itself is not suitable for investors expecting short-term gains but rather for investors attempting to estimate future investment prospects over a longer time horizon. Potential investment should be considered by each investor individually, and the study should be regarded as a possible template for their decision-making.

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