



## DUPONT ANALYSIS OF THE EFFICIENCY AND INVESTMENT APPEAL OF RUSSIAN OIL-EXTRACTING COMPANIES

Elena Rogova

*National Research University Higher School of Economics, Saint-Petersburg Campus,  
Soyuza Pechatnikov ul., 16, 190008 St.-Petersburg, Russia  
Email: erogova@hse.ru*

**Abstract.** For oil-extracting companies, which form the basis of the Russian economy, the problem of efficiency and investment appeal growth is very important due to the business specifics – the prevalence of fixed assets in the assets structure, the high dependence on natural conditions of extracting and on market prices. It is necessary to benchmark the efficiency and to concentrate managerial efforts at its leading factors. To reveal factors of efficiency, DuPont analysis was made. The sample consists of companies that were included at “The Energy Intelligence Top 100: Ranking The World’s Oil Companies 2012”. The financial data was collected for the period of 2008–2012. On the base of the regression analysis the impact of factors on the ROE (return on equity) was investigated.

**Keywords:** benchmarking, DuPont analysis, efficiency, investments appeal, oil-extracting companies.

**JEL classification:** G32, M21.

### 1. Introduction

One of the specific features of the modern economy is the growing global competition. As global players, oil-extracting companies should demonstrate the high level of efficiency to be attractive for their shareholders. The basic postulate of modern investments and financial management is the company’s value maximization for investors and other stakeholders (Jensen 2001). Though in this paper we do not intend to investigate the value-based management theory deeply, we would like to underline two important points. First, the return on the invested capital should exceed the certain level, satisfying the company’s stakeholders and depending on the size of the company, the level of risk, and the market rate of return. Second, the investments should be directed to reach economic or other benefits that meet the interests of the major stakeholders of the company. This means that the company’s efficiency and investments appeal are closely linked to each other.

At emerging markets, like Russian one, due to asymmetric information and lack of transparency, investors can make adequate conclusions on their investments in a special company only if they know and understand correctly its business model. Moreover, it is assumed that the information from financial reporting is new and relevant for investors (Kothari 2001). If a company demonstrates the steady growth of indicators and ratios that have a substantial importance for its current and poten-

tial investors, it has better opportunities to rise funding for its projects. To be attractive for its investments, a company should demonstrate a high level of performance related to its equity.

Oil-extracting companies form the basis of the modern Russian economy, providing the positive trade balance and the decisive contribution to exports activities. The recent statistic report highlights this leading role. 74% of Russian exports are provided by mineral products, mainly by oil (FSSS 2013). The problem of efficiency and investment appeal growth is very important for these companies because of the business specifics – the prevalence of fixed assets in assets structure, the high dependence on the natural conditions of extracting, from one hand, and on the market prices, from the other one. It is important to benchmark the efficiency and to concentrate managerial efforts at its leading factors.

The objective of this paper is to reveal factors that have impact at investment appeal of Russian oil-extracting companies. The long-time perspective is considered, thus we did not pay much attention to factors of stock pricing like price-earnings ratio etc. and concentrated at the return on equity analysis.

To reveal the factors of efficiency, DuPont analysis was made. The sample was formed from the companies that were included at “The Energy Intelligence Top 100: Ranking The World’s Oil Companies 2012”. The sample consists of 41 companies that are included also at “FT Global 500 December 2012”. 7 companies in the sample

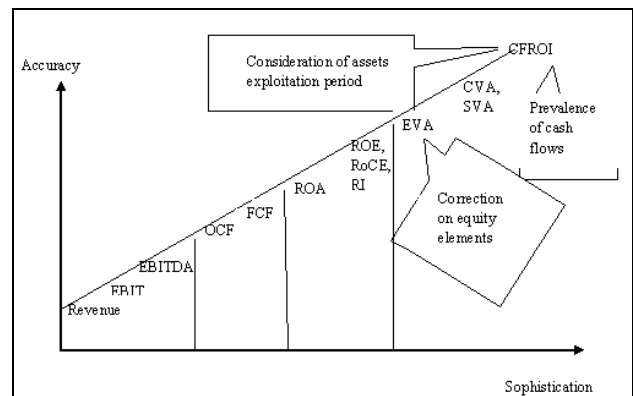
represent Russia; others are from different countries of the world. The financial data was collected for the period of 2008–2012. On the base of the regression analysis the impact of factors at ROE (return on equity) was investigated. Then the best and the worst companies were defined for the purpose of benchmarking for Russian companies. Some managerial recommendations were made on the base of the benchmarking.

The paper is organized as follows. The second section discusses briefly the explanatory role of DuPont analysis as a tool of the efficiency and investments appeal valuation. Then we discuss the specifics of the oil-extracting industry and prospects of its investigation on the base of DuPont analysis. We present the research method and the sample description in the fourth section and discuss empirical results in the fifth one. It also contains the managerial implication and the conclusion on the study.

## 2. Literature review

Main postulates of the value-based management theory were developed in the 1980<sup>th</sup> (Stewart 1991; Copeland *et al.* 1994; Rappaport 1999). The main reason for the appearance of this approach is that the accountancy-based system of efficiency and performance indicators does not provide shareholders with the information that may have relevance for investments decision. It is also sometimes controversial for managerial decisions (Bierman 1998) due to several reasons, among which there are the following: the inadequacy between the accountancy-calculated profit and the cash flow, the lack of information about risk influence, alternative costs and discounting factors in accountancy-based indicators. But it should be mentioned that the value-based system of efficiency indicators is rather complicated for constructing and further usage. The useful mapping of indicators, provided by (Teplova 2006), is presented at Figure 1.

ROE (return on equity) indicates profitability and efficiency from shareholders' point of view. Though it has several evident drawbacks, like other indicators, based upon the financial reporting and accountancy (among the most problematic there are the risk consideration, the retrospective vision, the sensitivity to random events), it is considered as a good ratio for a long-time period, when random factors seem to be eliminated. In (Higgins 2011) it is proved that 82 large American corporations at the 3-years period have demonstrated the correlation between the weighted average ROE and the market capitalization. So ROE may be used also as the indicator of the company's investments appeal.



**Fig. 1.** Mapping of indicators depending on the sophistication and the accuracy of shareholders' benefits calculation (source: Teplova 2006)

One of the strong advantages of ROE is the possibility of its disaggregation into different profitability factors. For these purposes different factor models are used, among which DuPont analysis is one of the most popular (Bernstein *et al.* 2001; Stickney, Brown 2006). DuPont analysis is a mode to disaggregate ROE into three factors:

- net profit margin that is an indicator of the operating efficiency (NPM);
- asset turnover ratio that indicates the assets use efficiency (ATR);
- equity multiplier that measures the financial leverage and thus, the financial activities efficiency (EM).

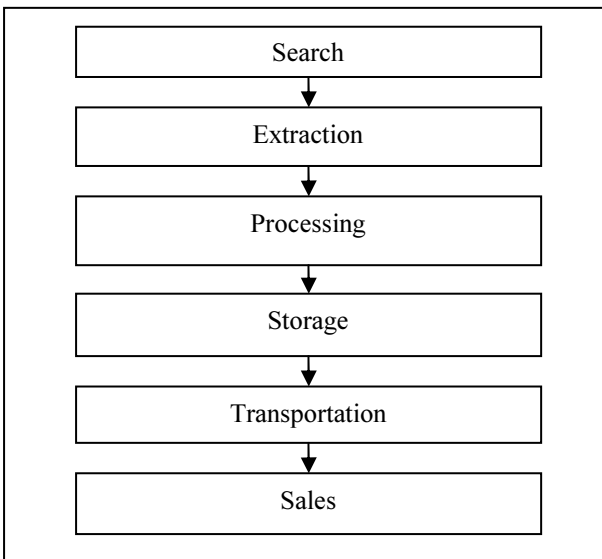
EM distinguishes ROE from return on assets (ROA) that may be decomposed into NPM and ATR. ROA helps managers to take decisions on operating and investments activities and indicates the company's profitability for all the capital owners.

There is a stream of literature in equity valuation examining the association between DuPont analysis and stock returns and the usage of DuPont analysis in valuation and financial forecasting (Nissim, Penman 2001; Fairfield, Yohn 2001). To summarise, the common opinion is the importance and relevance of DuPont analysis for different stakeholders (including investors) in evaluating and forecasting the efficiency and investments appeal (Soliman 2008; Chang *et al.* 2014). The other conclusion is that the importance of this tool varies from industry to industry because of the specific operational characteristics or environmental conditions. Fairfield *et al.* (2009) have pointed out that specific industry characteristics may affect the relative persistence of NPM and ATR, including industry concentration, barriers to market entry, expected rate of growth and accounting principles. Marttonen *et al.* (2013) have come to the similar conclusion related to the cash conversion cycle for particular industries and

its influence on the profitability. So, the next section of the paper is devoted to the analysis of the specific conditions of the oil-extracting industry and its ability to use ROE and DuPont analysis for purposes of efficiency and investments appeal.

**3. Oil-extracting industry: is ROE a good tool to measure efficiency and investment appeal?**

Oil-extracting industry is specialised at oil search, extracting, processing, storage, transportation and sales. Most of the key players in this industry in Russia are organised as vertically-integrated companies that operate along the whole value chain (Fig. 2). In other countries vertically-integrated companies are functioning alongside with companies that are more specialised at special stages. Usually companies are not involved in transportation if they can not ensure the constant volume of supply (Dannikov 2008). The high level of integration means that companies are operating at different market segments with different levels of profitability – the sale of the raw oil at the market, B2B market of oil-processed products, B2C market of gasoline and petrochemical products. The distribution of market portfolio within the company may have the strong impact at its profitability.



**Fig. 2.** The sequence of operations for a vertically-integrated company (source: developed by author)

One of the distinguishing features of this industry is a large deal of fixed assets in the assets structure. This means that (1) the barrier for a new player’s entry to this market is extremely high and the probability of the market structure change is very low; (2) due to the high level of capital expenditures and the importance for the economy, the government usually plays a proactive role at the

market. Many large corporations, especially at developing economies are fully or partly state-owned.

Due to substantial operating cash flows companies usually have enough funds for their operating and investments needs. So the third specific feature of the industry is the low level of financial leverage. The other reason for this is the volatility of oil market prices and considerations of market risks limitation.

The main range of products within the industry is standardized and has similar characteristics among all the manufacturers. This circumstance results in 2 sequences: (1) low level of brand loyalty and brand influence at the company’s market value; (2) low level of R&D intensity (the latter is measured as the contribution of R&D expenses to the company’s revenue). It means that there are practically no other leverages of value creation except the operational performance in the industry.

Characterizing the current state of the market, one should mention that, according to the statistic data, if the oil proven stock and consumer intensity would not change, the mankind is provided with oil for approximately 43 years (BP 2011). The level of consumption, meanwhile, is growing annually, in spite of the efforts of national governments and businesses to develop alternative energy sources. This promotes the activity in oil search and stock expanding.

In spite of these favorable factors, conditions for extracting are getting worse. The cost of extracting in 2011 reached approximately \$93 for a barrel. This tendency is an additional proof for the efficiency control and efforts of profitability increasing.

All the specific features discussed above are making the profitability analysis on the base of ROE important for the oil-extracting industry at the long-time period. Due to the low level of financial leverage the financial risk related to ROE is less important than its advantages. Other disadvantages may be eliminated by generalizing ROE for the long-time period.

**4. Sample description and research methodology**

To analyze the impact at ROE components, the modified DuPont expression (Damodaran 2011) was used as follows:

$$ROE = \frac{NE}{E} = \frac{NE}{EBT} \times \frac{EBT}{EBIT} \times \frac{EBIT}{TR} \times \frac{TR}{A} \times \frac{A}{E}, \quad (1)$$

where:  
 NE denotes net earnings;  
 E – equity;  
 EBT – earnings before taxes;

EBIT – earnings before interest payments and taxes;

TR – revenues;

A – assets.

This expression may reveal the influence of such factors as tax burden (the first multiplier), interest burden (the second one) and EBIT margin (the third multiplier) at net profit margin (NPM) and thus to investigate this factor of efficiency deeper, than applying the classic DuPont equation. Indicators remaining are assets turnover (ATR) and equity multiplier (EM).

The sample for analysis was formed from “The Energy Intelligence Top 100: Ranking the World’s Oil Companies 2012” (EI 2012). The rating consists of 100 companies, but the sample was reduced according to the possibility to obtain the financial data. The final sample consists of 41 companies that are represented also at “FT Global 500 December 2012” (FT Global 2012). 7 of the companies in the sample are Russian. Companies differ in assets, revenues and profits, but all of them belong to oil-extracting industry.

For the further analysis we used the data from Reuters ([www.reuters.com](http://www.reuters.com)) and collected the data for the period of 2008–2012 concerning market capitalization, financial reports and cash flows. The sample looks as follows (Table 1).

On the base of the modified DuPont analysis 5 factors having impact at ROE were calculated (Table 2). The data on companies is sorted according to ROE declining and provides with information about the leaders. The data is calculated as average for 5-years period to exclude the influence of unprofitable years for specific companies and for the industry as a whole. We also calculated price-to-book value ratio (P/B) to determine the level of investments appeal from the point of view of shareholders.

It is worth mentioning that two Russian companies – Novatek and Gazprom Neft – are among the leaders of the rating according to ROE criteria. Novatek is the absolute leader and has also the highest P/B ratio (4.33).

On the base of ROE decomposition and by means of EViews we conducted also the regression analysis to test the impact of elements of the DuPont analysis at ROE (Draper, Smith 2010). The dependence is presented at Table 3.

The regression analysis reveals the significance of 4 factors from 5. These factors are EBIT Margin, Interest burden, Tax burden and ATR. EM (which indicates the financial leverage) is insignificant because of the likelihood of all the companies in their low level of financial leverage.

## 5. Discussion on empirical results and conclusions

To understand the nature of the difference between the companies with high and low ROE (the ratio varies from 0.06% to 33.65%) we divided companies into the 10 best and the 10 worst ones (Table 4). We revealed the substantial difference in such components of ROE as ATR and EBIT Margin. Other elements do not differ much (Fig. 3).

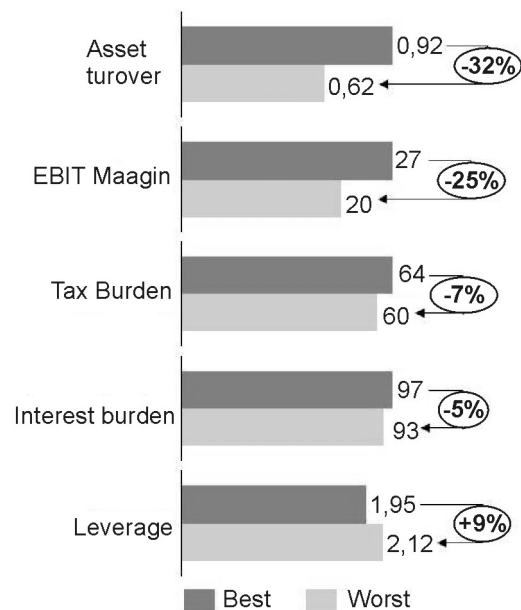


Fig. 3. The difference in average meanings of the best and the worst companies (source: developed by author)

Results of this segmentation demonstrate again the importance of the effective operating activity in the industry. It should be stressed that there are two Russian companies among the best 10 and there is no one among the worst 10. But to become efficient and to make investors confident in their future, the management should take constant steps to increase ROE by improving the assets turnover and EBIT margin.

**Table 1.** The list of companies and their market capitalization (source: EI 2012, Reuters; selected by author)

№	Name	Country	Reuters ticker	Market cap, mln.\$
1	Exxon Mobil	USA	Exxon Mobil Corp (XOM,N)	408 777
2	PetroChina	China	PetroChina Co Ltd (PTR,N)	278 968
3	Royal Dutch Shell	UK	Royal Dutch Shell PLC (RDSA,N)	222 425
4	Chevron	USA	Chevron Corp (CVX,N)	211 951
5	Petrobras	Brazil	Petroleo Brasileiro Petrobras SA (PBR,N)	170 836
6	Gazprom	Russia	Gazprom OAO (GAZP,MM)	145 761
7	BP	UK	BP PLC (BP)	140 271
8	Total	France	Total SA (TOT,N)	120 368
9	Sinopec	China	China Petroleum & Chemical Corp (SNP,N)	98 110
10	ConocoPhillips	USA	ConocoPhillips (COP,N)	96 769
11	Eni	Italy	Eni SpA (E,N)	93 820
12	CNOOC	Hong Kong	CNOOC Ltd (CEO)	91 777
13	Statoil	Norway	Statoil ASA (STL,OL)	86 423
14	BG Group	UK	BG Group PLC (BG,L)	78 569
15	Occidental Petroleum	USA	Occidental Petroleum Corp (OXY,N)	77 226
16	Rosneft'	Russia	NK Rosneft' OAO (ROSN,MM)	75 653
17	Lukoil	Russia	NK Lukoil OAO (LKOH,MM)	51 458
18	Suncor Energy	Canada	Suncor Energy Inc (SU,N)	50 844
19	Reliance Industries	India	Reliance Industries Ltd (RELI,NS)	48 200
20	Oil & Natural Gas	India	Oil and Natural Gas Corporation Ltd (ONGC,NS)	45 066
21	Novatek	Russia	Novatek OAO (NVTK,MM)	40 422
22	Surgutneftegas	Russia	Surgutneftegaz OAO (SNGS,MM)	40 383
23	Anadarko Petroleum	USA	Anadarko Petroleum Corp (APC,N)	39 608
24	Apache	USA	Apache Corp (APA,N)	38 601
25	Imperial Oil	Canada	Imperial Oil Ltd (IMO,A)	38 437
26	Canadian Natural Resources	Canada	Canadian Natural Resources Ltd (CNQ,N)	36 397
27	PTT	Thailand	PTT PCL (PETFF,PK)	32 776
28	Sasol	South Africa	Sasol Ltd (SSL)	31 104
29	Repsol YPF	Spain	Repsol SA (REP,MC)	30 581
30	Eog Resources	USA	EOG Resources Inc (EOG,N)	29 925
31	Formosa Petrochemical	Taiwan	Formosa Petrochemical Corp (6505,TW)	29 694
32	Woodside Petroleum	Australia	Woodside Petroleum Ltd (WPL,AX)	29 054
33	Devon Energy	USA	Devon Energy Corp (DVN,N)	28 740
34	Cenovus Energy	Canada	Cenovus Energy Inc (CVE,N)	27 081
35	Gazprom Neft	Russia	Gazprom neft' OAO (SIBN,MM)	25 084
36	Inpex	Japan	Inpex Corp (1605,T)	24 833
37	Husky Energy	Canada	Husky Energy Inc (HSE,TO)	24 525
38	Marathon Oil	USA	Marathon Oil Corp (MRO,N)	22 325
39	Tullow Oil	UK	Tullow Oil PLC (TLW,L)	22 103
40	Hess	USA	Hess Corp (HES,N)	20 135
41	PTT Exploration & Production	Thailand	PTT Exploration and Production PCL (PTTE,F)	18 779

Table 2. Results of ROE decomposition (source: calculated by author)

№	Name	ROE, %	Tax Bur- den, %	Interest burden, %	EBIT Margin, %	ATR	EM	P/B
1	Novatek	33.65	82.84	97.94	54.72	0.44	1.71	4.33
2	CNOOC	23.48	73.82	99.60	37.44	0.58	1.47	1.84
3	Imperial Oil	22.69	75.58	100.00	14.04	1.16	1.85	2.32
4	PTT Exploration & Production	22.23	61.08	95.00	48.63	0.39	2.02	1.75
5	Statoil	21.84	32.67	98.08	28.69	0.87	2.71	1.62
6	Exxon Mobil	19.83	56.86	99.83	12.45	1.35	2.07	2.46
7	Chevron	19.81	57.44	100.00	17.86	1.12	1.73	1.55
8	Oil & Natural Gas	19.74	64.98	100.00	28.10	0.64	1.70	1.81
9	Gazprom Neft	19.49	77.00	94.29	16.90	0.97	1.65	0.93
10	PTT	17.98	61.84	89.68	7.54	1.66	2.59	1.66
11	Conoco Phillips	17.73	66.32	100.00	25.47	0.46	2.36	2.02
12	Sasol	17.23	67.00	93.19	20.77	0.81	1.65	2.09
13	Woodside Petroleum	15.27	73.25	100.00	52.46	0.22	1.76	1.92
14	Total	15.23	47.01	97.67	13.70	1.02	2.38	1.29
15	Rosneft'	14.98	79.22	97.71	15.64	0.74	1.70	1.05
16	Devon Energy	14.94	100.72	96.95	24.67	0.27	1.89	1.35
17	Lukoil	14.57	79.22	94.91	10.31	1.37	1.37	0.70
18	Occidental Petroleum	14.48	62.84	100.00	37.42	0.38	1.60	1.93
19	Sinopec	14.12	69.92	90.76	4.41	2.10	2.43	1.19
20	Royal Dutch Shell	13.93	55.12	98.84	9.88	1.27	2.04	1.18
21	Gazprom	13.90	77.35	97.24	31.22	0.40	1.46	0.54
22	BG Group	12.99	65.02	98.96	35.93	0.28	1.99	1.60
23	Cenovus Energy	12.91	68.59	100.00	11.64	0.68	2.40	2.73
24	Repsol YPF	12.36	69.25	83.86	9.16	0.83	2.75	0.89
25	PetroChina	12.27	71.75	93.42	9.96	0.98	1.91	1.63
26	Marathon Oil	12.17	51.91	97.19	33.60	0.40	1.95	1.22
27	Reliance Industries	11.88	79.30	100.00	7.46	1.03	1.97	1.45
28	Apache	11.55	51.97	100.00	39.84	0.29	1.84	1.23
29	Hess	10.48	62.52	100.00	8.60	0.94	2.09	0.95
30	Surgutneftegas	10.46	80.47	99.21	28.49	0.41	1.13	0.69
31	Husky Energy	10.23	73.31	93.83	12.45	0.64	1.86	1.27
32	Petrobras	9.77	74.99	98.28	17.44	0.43	1.83	1.02
33	Suncor Energy	9.71	60.79	100.00	16.33	0.50	1.95	1.28
34	Tullow Oil	9.64	52.02	94.65	41.24	0.20	2.08	4.23
35	BP	9.54	68.28	107.59	4.73	1.25	2.68	1.18
36	Canadian Natural Resources	9.18	66.20	100.00	22.80	0.30	2.06	1.48
37	Inpex	7.34	25.36	99.80	57.65	0.36	1.40	0.79
38	Formosa Petrochemical	7.29	98.15	100.00	2.48	1.77	2.06	4.15
39	Eni	6.23	41.79	52.46	14.33	0.81	2.50	1.24
40	Eog Resources	4.79	47.02	83.61	14.04	0.37	2.05	2.25
41	Anadarko Petroleum	0.06	63.60	93.37	9.83	0.25	2.63	1.92
	Average	14.1	65.72	96.05	22.20	0.75	1.98	1.68

**Table 3.** Results of the regression analysis on ROE (source: calculated by author)

Dependent Variable: ROE				
Method: Least Squares				
Date: 05/22/13 Time: 20:46				
Sample: 1 41				
Included observations: 41				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EBIT_MARGIN	0.304057	0.062589	4.857999	0.0000
INTEREST_BURDEN	0.065846	0.013426	4.904424	0.0000
EM	0.009460	0.023487	0.402794	0.6895
TAX_BURDEN	0.142973	0.053270	2.683906	0.0110
ATR	0.095881	0.018682	5.132182	0.0000
C	-0.173410	0.083345	-2.080621	0.0449
R-squared	0.588378	Mean dependent var		0.132691
Adjusted R-squared	0.529575	S.D. dependent var		0.062284
S.E. of regression	0.042719	Akaike info criterion		-3.333887
Sum squared resid	0.063872	Schwarz criterion		-3.083120
Log likelihood	74.34467	Hannan-Quinn criter.		-3.242571
F-statistic	10.00588	Durbin-Watson stat		0.934726
Prob(F-statistic)	0.000005			

**Table 4.** Companies with the highest and the lowest ROE (source: calculated by author)

10 companies with the highest ROE						
Name	ROE, %	Tax Burden, %	Interest burden, %	EBIT Margin, %	ATR	EM
Novatek	33.65	82.84	97.94	54.72	0.44	1.71
CNOOC	23.48	73.82	99.60	37.44	0.58	1.47
Imperial Oil	22.69	75.58	100.00	14.04	1.16	1.85
PTT Expl & Production	22.23	61.08	95.00	48.63	0.39	2.02
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Exxon Mobil	19.83	56.86	99.83	12.45	1.35	2.07
Chevron	19.81	57.44	100.00	17.86	1.12	1.73
Oil & Natural Gas	19.74	64.98	100.00	28.10	0.64	1.70
Gazprom Neft	19.49	77.00	94.29	16.90	0.97	1.65
PTT	17.98	61.84	89.68	7.54	1.66	2.59
Average (10)	22.07	64.41	97.44	26.64	0.92	1.95
10 companies with the lowest ROE						
Name	ROE, %	Tax Burden, %	Interest burden, %	EBIT Margin, %	ATR	EM
Petrobras	9.77	74.99	98.28	17.44	0.43	1.83
Suncor Energy	9.71	60.79	100.00	16.33	0.50	1.95
Tullow Oil	9.64	52.02	94.65	41.24	0.20	2.08
BP	9.54	68.28	107.59	4.73	1.25	2.68
Canadian Natural Resources	9.18	66.20	100.00	22.80	0.30	2.06
Inpex	7.34	25.36	99.80	57.65	0.36	1.40
Formosa Petrochemical	7.29	98.15	100.00	2.48	1.77	2.06
Eni	6.23	41.79	52.46	14.33	0.81	2.50
Eog Resources	4.79	47.02	83.61	14.04	0.37	2.05
Anadarko Petroleum	0.06	63.60	93.37	9.83	0.25	2.63
Petrobras	7.36	59.82	92.98	20.09	0.62	2.12
Average (10)	9.77	74.99	98.28	17.44	0.43	1.83

We applied the results of this analysis to three Russian companies to benchmark their indicators and managerial efforts. The companies are the following: JSC Gazprom, JSC Surgutneftegaz and JSC Rosneft'. The benchmark has revealed following tendencies:

- all three companies have ROE similar to the average market indicator (14.1% in comparison with 13.9% for Gazprom, 15.0% for Rosneft' and 10.7% for Surgutneftegaz), though leaders have an average indicator of 22.07%;
- as for EBIT Margin, it is close to market leaders for Gazprom (31% vs 27%) and for Surgutneftegaz (28% vs 27%), but Rosneft' is very far from them, as well as from the average indicator (only 11%);
- concerning to ATR, all Russian companies are far below the leaders' indicator (0.92 vs 0.40 for Gazprom and 0.41 for Surgutneftegaz); though Rosneft' has ATR 0.79, that exceeds the average market indicator 0.75 but is still below the leaders' ratio.

The results of this study may be used by companies' managers for discovering problems and benchmarking leaders' efforts. As for shareholders, they may use ROE for taking decisions on investing in the companies with the best ROE, considering this indicator alongside with the others and capturing more value from their investments.

For further investigation, it seems interesting to expand the framework and to create the transparent model of equity evaluation on the base of the efficiency ratios. But even at this step it is clear that financial ratios may have an important impact at efficiency and investment appeal of oil-extracting companies.

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