

Acquisition premiums and subsequent impairment of goodwill in 2010–2015 in oil and gas sector

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Abstract. Since 2014 oil price has decreased from above 100US\$ to sinking below 28US\$, which is the lowest price since 2003. Analysts expect M&A (mergers and acquisitions) activity in oil and gas sector to increase in 2016. That is why, two empirical researches are conducted to investigate factors influencing premiums paid and impairment of goodwill. The results showed that the increase in P/NAV and P/2P variable and taking logarithm from them lead to increase in the premium paid, while the increase in EV/BOED and in Oil price leads to decrease in the premium paid. According to the model of goodwill: goodwill on acquisition's increase impacts positively, deal value increase shows negative impact, increase of % of gas in target company also shows positive impact, oil price increase affects positively.

Keywords: market capitalization, merger premiums, goodwill impairment, deal value, acquisition premiums.

Премии по сделкам и последующее списание гудвилла в 2010–2015 годах в нефтегазовом секторе

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Аннотация. С 2014 г. цена на нефть снизилась от 100 долл. США до порога в 28 долл. США, что является самым сильным падением с 2003 г. Аналитики ожидают, что в 2016 г. увеличатся сделки M&A (слияния и поглощения) в нефтегазовом секторе. Поэтому были проведены два эмпирических исследования: влияние факторов на премии по сделкам и влияние факторов на последующее списание гудвилла. Результаты исследования показали, что увеличение мультипликаторов P/NAV и P/2P приведет к увеличению уплаченной премии, в то время как увеличение мультипликатора EV/BOED и рост цены на нефть приводит к снижению уплаченной премии. В соответствии с моделью гудвилла: гудвилл, учтенный при поглощении, влияет положительно, увеличение стоимости сделки показывает негативное влияние; рост доли газа в компании-цели до поглощения также показывает положительное влияние, рост цен на нефть влияет положительно.

Ключевые слова: рыночная капитализация, премия при слиянии, списание гудвила, цена сделки, премия при поглощении.

METHODOLOGY OF SURVEY

As the cost of completing a merger, the premium paid on mergers has received much attention.

Most of these characteristics are peculiar to the bidder, the target, or the deal itself. After the transaction goodwill can be created as the dif-

ference between Deal value (Payment consideration) and Net Asset Value of the target. The main assumption is that by investigating whether goodwill is impaired after the deal, it can be assumed whether the transaction was overpaid or not and which factors influenced overpayment for the deal. Goodwill write downs have wreaked havoc on income statements and balance sheets across many sectors in multiple markets.

The purpose of the following two research studies is to shed light on overpayment for the deals and future goodwill impairment by examining premiums paid and whether many goodwill impairment losses arise from overpayment for the target at the time of the acquisition, rather than from a subsequent deterioration of goodwill values.

Numerous studies offer insight on characteristics that can cause the premiums paid by bidders for targets to vary among mergers as stated in the paper of J. Hagendoff et al. (2012). In general, the studies find that bidder, target, or deal characteristics that represent greater expected synergies or that increase the potential competition for the target will result in higher merger premiums. Since the synergy characteristics only contribute to the target's value if a merger has been consummated, they are not factored into the market stock price until the firm becomes the target of a merger. To the extent that the potential benefits of mergers vary among bidders, they influence the premium that the bidder is willing to offer.

For example, for banking industry, high growth of the target firm and its market and a low capital-to-assets ratio are particularly attractive to bank managers, for which they are willing to pay a premium¹.

The market capitalization has a positive effect on the formation of the value of the premium; operating income of the target company and the number of outstanding shares — negative². Preemptive bidding and target resistance were investigated by T. Dimopoulos (2014). Simulation experiments showed that initial bidders have, on average, a higher valuation for the tar-

get than rival bidders, so that a relatively low initial bid is sufficient to deter a rival from entry³. However, no evidence was found that high merger premiums paid are unlikely to be responsible for acquirers' long-run post-merger underperformance⁴. In Russian practice statistical resources are used for computing premiums for M&A deals⁵.

The defensive acquirers experience significant negative abnormal returns on the announcement day, and that smaller competitors have positive abnormal returns on the announcements of defensive acquisitions. In contrast, larger competitors do not react to the announcements, which is consistent with takeover premium hypothesis⁶.

In addition, goodwill impairment has been found to be positively associated with the that the payment of higher takeover premiums and the amount initially recorded as goodwill.

SAMPLE

We obtain sample of oil and gas mergers from the Bloomberg and from Zephyr of Buro Van Dijk databases. The target or the acquirer are restricted to being from the Oil and Gas sector. The deals from all subsectors are considered: Upstream, Midstream, Downstream and Oil Financial Services companies and Integrated Majors.

The period is limited to January 1, 2010 to December 31, 2015. The total amount of deals in Bloomberg for oil and gas industry for the given period is 3474 global deals, not including Russia and 130 deal in Russia. Zephyr database include 50 656 deals for oil and gas sector.

A filter is used to focus on the deals with the premium known. In addition, only completed and pending deals are tested. Withdrawn deals are not taken into account. Moreover, only deal with known multiples are taken into account.

³ Dimopoulos, T., Sacchetto, S. (2014). Preemptive bidding, target resistance, and takeover premiums. *Journal of Financial Economics*, 114, pp. 444–470.

⁴ Antoniou, A., Arbour, P., Zhao, H. (2008), How Much Is Too Much: Are Merger Premiums Too High? *European Financial Management*, 14/2, pp. 268–287.

⁵ Fedotova, M. A. (2008) The prize for the control and reduction of the size of the package: the practical application of national statistics. *Valuation activity*, № 1, pp. 67–81.

⁶ Baradwaj, B. G., Dubofsky, D. A., Fraser, D. R. (1996). Defensive acquisitions in the banking industry: The takeover premium hypothesis. *Journal of Economics and Finance*, pp. 119–141.

¹ Rhoades, S. A. (1987). Determinants of premium paid in bank acquisitions. *Atlantic Economic Journal*, 15, pp. 20–30.

² Nazarova V. V., Shevyakina O. R. (2015). Determining the optimal premium in mergers and acquisitions in the oil and gas sector. *Corporate Finance*, 4(36), pp. 5–30.

In order for a transaction to be included the acquirer purchases at least 1% of the target's equity in the transaction and the acquirer finishes our sample period with at least 10% ownership, since otherwise it would be treated as minority stake and requires a discount. We thus narrowed the sample to 182 deals from Bloomberg and 70 deals from Zephyr database.

If the acquirer proposes stocks as a valuable means of payment, it requests that a large transparent market exists for the bidder's stock to be accepted.

Only 48 deals were investigated for the goodwill impairment, with many multiples.

The above arguments lead to the following hypotheses:

1. The premium depends on the method of payment;
2. The premium paid depends on multiples;
3. Goodwill impairment shows that the deal is unsuccessful.

For the first part — Premiums paid for M&A in oil and gas industry, the variables mentioned below will be tested, using also suggested variables in the paper of T. Dimopoulos, S. Sacchetto (2014)⁷:

- Cash offer Dummy variable equal to one for contests in which the final bid is a pure cash offer.
- Stock offer Dummy
- Deal value — Value of cash and all securities offered by the bidder to the target shareholders in Euro
- Merger premiums as the purchase price paid for by the acquirer scaled by the pre-merger book value of the target. We define the percentage book value premium as:

$$BVPREM(\%) = \left(\frac{\text{deal value}}{s \times BV(\text{equity})} - 1 \right) \times 100,$$

- Friendly Dummy variable equal to one for contests in which the management declares a friendly attitude toward the initial bidder.
- Premiums for target price
- Target share increase — how much target share price has increased from announcement date till the competed date.

- Tender offer Dummy variable equal to one for contests in which the initial bid is a tender offer. Source: SDC Platinum.

For each deal in the unrestricted full sample, information was collected on the terms of the transaction and bidder managers' projections of merger-related cash flows from press releases and news stories and from annual reports. The analysis focuses on successful deals to minimize the impact of the implicit probability of completion embedded in the merging firms' stock prices.

It will be done in 3 steps:

1. Analysis of the impact cash or stock consideration on premiums paid
2. Analysis of impact of multiples and descriptive characteristics
3. Analysis of impact of certain Upstream sector multiples on Upstream sector deals.

The second part is connected with impairment of goodwill. The FASB 1999 Exposure Draft distinguished four acquisition characteristics that may indicate impairment of the goodwill acquired in a business combination: (1) payment of a significant premium relative to the purchase price paid; (2) an auction-like situation or the presence of multiple bidders that are competing for the target; (3) use of the acquirer's stocks as the primary form of consideration; (4) a considerable amount of goodwill relative to the acquisition price.

Consistently, Hayn and Hughes (2006)⁸ found that goodwill acquired in stock deals is more likely to be impaired over the years following the acquisition, suggesting that those targets were probably overpaid. Tested factors for goodwill impairment:

- Bid premium — Announced date %.
- Goodwill on acquisition m.
- Deal value in EUR.
- P/CF.
- P/NAV.
- EV/BOED.
- P/2P MMBOE1.
- EV/EBITDA.
- %gas.
- Oil price.
- US Henry hub.

⁷ Dimopoulos, T., Sacchetto, S. (2014). Preemptive bidding, target resistance, and takeover premiums. *Journal of Financial Economics*, 114, pp. 444–470.

⁸ Hayn, C., Hughes, P. (2006). Leading indicators of goodwill impairment. *Journal of Accounting, Auditing and Finance*, 21, pp. 223–265.

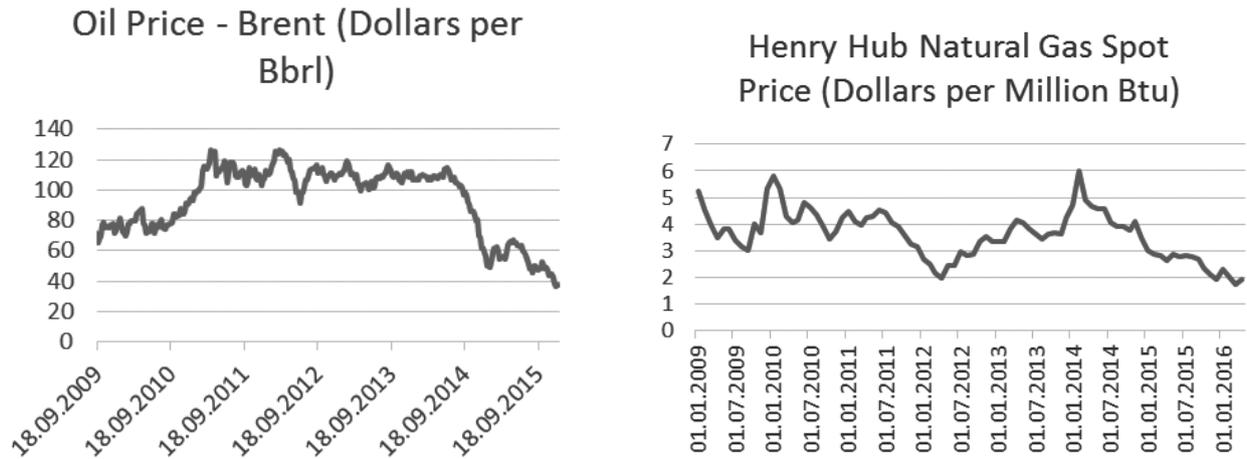


Figure 1. Oil and gas price

- Target share increase.
- Control.
- Cross border.
- Losses of the target.

On the graph the fluctuation of oil and gas are evident. That is why it is assumed that in times of high oil, premium paid is higher.

ACQUISITION PREMIUMS PAID IN 2010–15 (in Russia and abroad)

An Acquisition premium is the difference between the estimated real value of a company and the actual price paid to obtain it. Acquisition premium represents the increased cost of buying a target company during a merger and acquisition. There is no requirement that a company pay a premium for acquiring another company; depending on the situation, they may even get a discount.

The premium in a merger or acquisition is defined as the difference between the offer price and the market price of the target before the announcement of the transaction. A substantial body of evidence indicates that M&A premiums average 20 to 30 percent above a target's pre-acquisition share price. For example, Kengelbach and Roos (2012)⁹ found that the average premium was 36 percent during the period 1990–2010. As conventional wisdom suggests, acquirers perform better when they pay a premium that is below average rather than above average. As mentioned earlier, a high premium is a sure path to

overpaying and reducing the likelihood of making the acquisition a success.

M&A premiums are sometimes referred to as control premiums. In general, the target's shareholders demand them as compensation for transferring controlling interest in the target to the acquirer. Majority control in a company conveys many valuable rights and benefits, including control over all operating policies and decisions, the selection of management and the board of directors, and the distribution of cash to shareholders.

M&A premiums can also represent compensation for other economic benefits, such as the expected synergies associated with the transaction. They can reflect capital market pricing inefficiencies as well, wherein a target is undervalued because the company or its industry is out of favor with investors.

In essence, in about every other transaction, the acquirer's management commits some type of critical error — in the due diligence investigation, in the bidding process, or in the post-acquisition integration of the target. How to avoid each of these pitfalls is beyond the scope of this book; instead, we focus on the process of assessing the target's value — namely, the specific accounting, finance, and taxation issues that the analyst must successfully deal with to estimate the value associated with a merger or acquisition.

In 2012 premium for the deals were the highest. Buyers typically pay a premium to acquire all the shares of a company. But this year that premium has been larger. According to deal tracker

⁹ Kengelbach, Jens, Klemmer, Dominic C., Roos, Alexander. (2012). How M&A Can Grow Portfolio Value. The 2012 M&A Report.

Dealogic, on average, acquirers of publicly trading companies have paid 25% more than where those companies' shares had traded. That's up from 23% in the first seven months of 2011, and it's the highest average premium paid since 2001.

Consolidation is expected across the energy sector as companies struggle with low oil prices and a pullback in drilling activity. The deal comes months after Schlumberger's two biggest competitors, Halliburton Co. and Baker Hughes Inc., agreed to combine.

The price tag values Houston-based Cameron — which makes drilling equipment and supplies maintenance equipment to pipelines, refineries and oil-and-gas wells — at \$66.36 a share, a 56.3% premium to closing price. Cameron's shares have fallen 42% in the past 12 months as the price of oil plunged. But stock in Cameron surged 41% to \$59.81 midday in 2015. Shares of Schlumberger fell 4.7% to \$69.11.¹⁰

Stock and cash consideration are important for the deal premium. For example, in Schlumberger — Cameron deal, Cash and stock deal represents 56% premium for Cameron shareholders. Although it is paying a high premium based on Cameron's current price, the bid represents a 10% discount to where the company's shares traded a year ago.

When the prices for crude oil was high, premium was also high, but in 2014–2015 many deals were cancelled. Santos Ltd. rejected an offer worth \$11.3 billion including debt from Scepter Partners, calling it "opportunistic." Canadian Oil Sands Ltd. snubbed a C\$6.6 billion (\$4.96 billion) bid from Suncor Energy Inc. saying it "substantially" undervalued the company.

"Many names among the E&Ps require a much higher oil price than \$60 a barrel to justify their valuation and you won't have a transaction if you don't pay a premium to the share price"¹¹.

The investigation of the impact of factors on the share price is done in 3 steps.

¹⁰ Schlumberger to Buy Cameron International for \$12.7 Billion. *The Wall Street Journal*, 26.08.2015. At: <http://www.wsj.com/articles/schlumberger-to-buy-cameron-international-for-12-7-billion-1440584852>.

¹¹ Rascouet, A. Oil Dealmakers Find Slim Pickings among Premium-Priced Explorers. *Bloomberg*, 16.11.2015. At: <http://www.bloomberg.com/news/articles/2015-11-16/oil-dealmakers-find-slim-pickings-among-premium-priced-explorers-sh16r3oh>.

1. Impact of cash and stock consideration and other characteristics (database from Bloomberg).

a) We assume that premium in stock deals are less than in cash deals. Intuition behind this: in cash transactions, acquiring shareholders take on the entire risk that the expected synergy value embedded in the acquisition premium will not materialize.

b) Friendly deal: Intuition behind this: For friendly deal the premium is less than for hostile, as in hostile deals the buyer need to overpay to overcome the resistance. In fact, bidders often pay a premium to the target firm, which introduces problems in financing the deal¹².

c) Losses of the target: No premiums should exist.

d) Diversification: For 1995–05, however, a significant premium emerges, shedding further light on the notion that the diversification discount or premium may be a factor of the time period being analyzed. However, for the premiums it is insignificant¹³.

2. Impact of multiples on deals from all subsectors (database from Zephyr).

a) P/E: The price-earnings ratio (P/E Ratio) is the ratio for valuing a company that measures its current share price relative to its per-share earnings.

b) P/CF: Target value to cash flow. The ratio takes into consideration a stock's operating cash flow, which adds non-cash earnings such as depreciation and amortization to net income. Source: annual reports.

c) P/ NAV: Target value to net asset value based on net asset value of the acquired company after the acquisition based on annual statement. Source: annual reports.

d) P/ Assets: Target value to assets.

e) EV/ EBITDA.

f) Oil price \$/bbl.

g) US Henry hub \$/mln btu/

h) Target share acquisition: share acquisition between announcement and completed date.

i) Cross border (Dummy).

¹² Geppert, M., Dorrenbacher, C., Gammelgaard, J., Taplin, I. (2013). Managerial risk-taking in international acquisitions in the brewery industry: institutional and ownership influences compared. *British Journal of Management*, 24 (3), pp. 316–332.

¹³ Bunnim, D. (2005). Diversification Discount or Premium? Evidence from Merger Announcements., *NSSB*, 205.

3. Impact of special multiples on E&P companies (Upstream sector; database from Zephyr).

a) P/CF.

b) P/ NAV.

c) EV/ BOED: Also referred to as price per flowing barrel, this is a key metric used by many oil and gas analysts. This takes the enterprise value (market cap + debt – cash) and divides it by barrels of oil equivalent per day (BOE/D). All oil and gas companies report production in BOE. If the multiple is high compared to the firm’s peers, it is trading at a premium, and if the multiple is low amongst its peers it is trading at a discount. Source: annual reports.

d) P/2P: Target value divided by the proven and probable (2P) reserves shows what multiples the company is trading at. Proven and probable (2P) refers to geologic reserves, such as oil, that are more likely than not able to be recovered.

e) EV/ EBITDA.

f) %gas.

g) Oil price.

h) US Henry hub.

i) Target share acquisition.

j) Control.

k) Cross border.

l) Losses of the target.

m) Year.

It should be noted that we assume that the dependence between premium and variables could not be linear, that is why we construct both linear and non-linear models.

We apply three tests to check the adequacy of the model for the significance level of 20%:

- R2 – explain how much of the variance of the model is due to explanatory variables.
- F statistics – if F statistics of the model is higher than F critical, the model is significant.
- P-value – if it is lower than 20%, then coefficients are significant and can be included in the model.

In the first part we have investigated the impact of cash or stock consideration on the amount of the premium.

Among 182 deals 66% used cash consideration and 49% used stock consideration. Only 54% used only cash consideration.

The average premium among 182 deals is 179%, calculated as:

$$Premium\ paid = \frac{(Cash\ per\ share + Stock\ offered\ per\ share \times Acquirer\ price)}{Tar\ get\ Share}$$

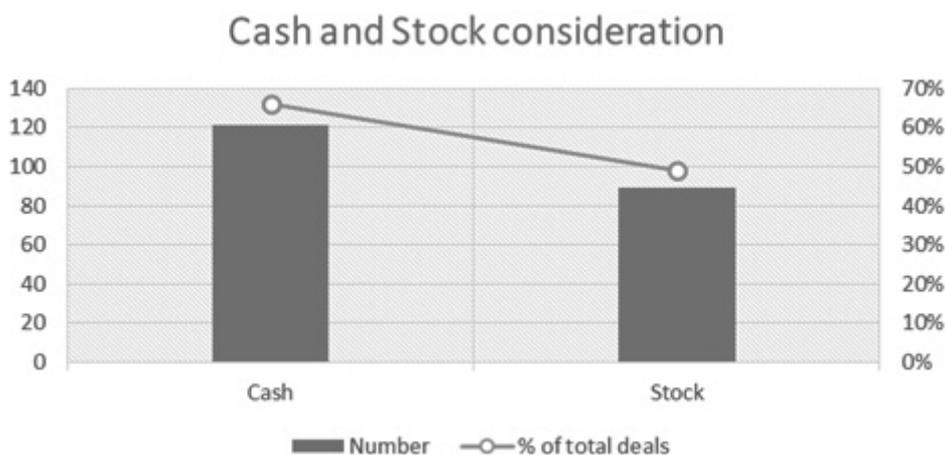


Figure 2. Cash and Stock consideration

Table 1

Average premiums and total value

	Premium paid	Announced Premium	Announced Total Value (mln. Eur)
Mean	179%	33%	139 989
Mediana	27%	29%	15 368
1st q	8%	10%	5502
3rd q	65%	50%	71 387
Max	11473%	176%	7 330 483
Min	-100%	-45%	1022

Announced average premium is 33% computed by Bloomberg on the day of the announcement. Average announced Total Value is 139 989 mln Euros.

The first model is presented below. It analyzes the impact of several coefficients on the premium paid.

The distribution of the sample is evident from the Figure 3. Most deals are friendly (166) and about 37.91% of the deals include buying company with losses (69). The distribution per year is approximately the same. In 49 transactions the buyer was from the industry other than oil and gas.

The first model is presented below. It is the first attempt to investigate the impact of variables on the model. Tested variables are presented in the Table 2 and are considered to be significant depending on the P-value test.

R2 of the model is 0.1283, meaning that this model describes only 12.8% of the variance in the premiums paid. F-test shows that the model is significant. P-value test shows that only few coefficients are significant at 20% confidence level:

$$PP = 0.186 \times Cash - 0.023 \times 2011Y + 0.154 \times 2015Y,$$

where: *PP* – premium paid.

But this model is not significant, since most variables are Dummy variables. However, we may assume, that if Cash is used then premium is 0.186 higher, if the deal occurred in 2011 than it decreased the premium by 0.023 (the reason may be stabilized high oil prices), if the deal has occurred in 2015 it increases the premium by 0,154. However, the premium here defined as %.

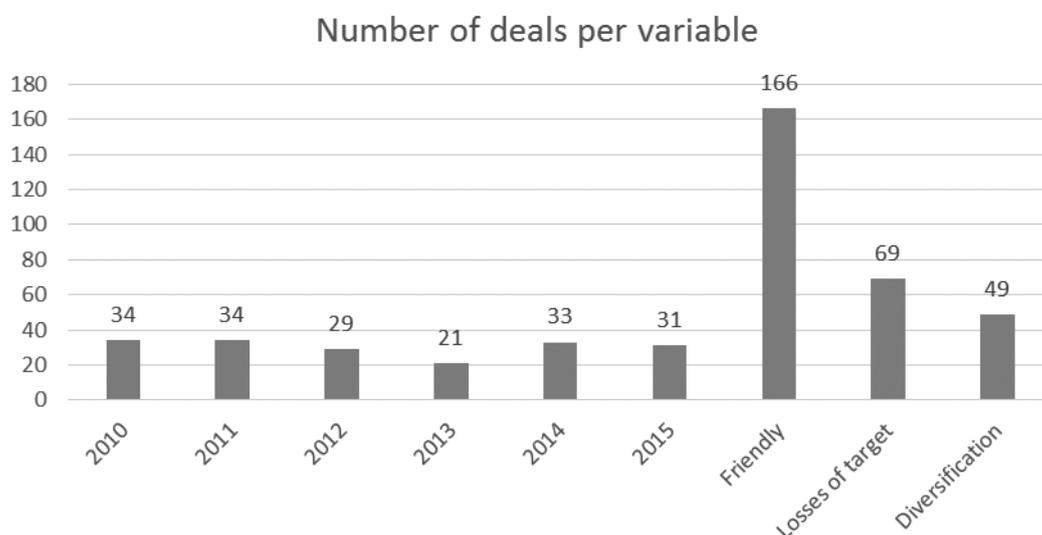


Figure 3. Number of deals per variable

Table 2

Model 1. Premiums paid calculated in %

SUMMARY OUTPUT Model 1			
R Square	0.128 349		
Observations	182		
	<i>Coefficients</i>	<i>P-value</i>	<i>P value 20%</i>
Intercept	0.175 049	0.197241	Not
Announced Total Value (mil.)	2.71E-06	0.528768	Not
Cash (Dummy)	0.186607	0.071355	Significant
Stock (Dummy)	-0.02141	0.782372	Not
Cash/ Stock per share %	-0.04862	0.559052	Not
2010 (Dummy)	0	0.071355	Significant
2011 (Dummy)	-0.02263	0.071355	Significant
2012 (Dummy)	-0.00289	0.974132	Not
2013 (Dummy)	0.047684	0.628225	Not
2014 (Dummy)	0.103983	0.236526	Not
2015 (Dummy)	0.154379	0.092059	Significant
Friendly (Dummy)	0.09888	0.260376	Not
Losses of target (Dummy)	0.020544	0.558125	Not
Diversification (Dummy)	-0.16603	0.008465	Significant
New product (Dummy)	-0.13494	0.015585	Significant

Model 2 is regression for global deals based on announced premium as Y, and the variables mentioned below as explanatory variables. In this model we evaluate the impact of ROA and market premiums for the stated period before the deal. We also use Stock, 2011 as variables, since in previous model they are significant.

R2 of the model is 0.2553, meaning that this model describes only 25.53% of the variance in the premiums paid. F-test shows that the model is significant. P-value test shows that only few coefficients are significant at 5% confidence level:

$$PP = 0.28 - 0.0101 \times (\text{Pr to 1Day Avg Px}(\%)) \times 0.011 \times (\text{Pr to 1Month Avg Px}(\%)) - 0.00421 \times (\text{Pr to 90Day Avg Px}(\%)),$$

where: *PP* – premium paid.

So, premiums to the Target price for 1 day, 1 month, 90 days affect the premium paid. It is interesting, that according to the regression, 1-day premium and 90-day premium affect negatively, while 1-month premium affect positively. In addition, Stock and 2011 variables appear to be insignificant for this model.

In Model 3 we investigate whether the model is nonlinear and whether the data distrusted normally.

First, we apply Normal Probability Plot Test for Model 1 and Model 2. Normal Test Plots (also called Normal Probability Plots) are used to investigate whether process data exhibit the standard normal “bell curve” or Gaussian distribution. A normal probability plot can be used to determine if small sets of data come from a normal distribution. This involves using the probability properties of

Table 3

Model 2. Announced premium

SUMMARY OUTPUT			
R Square	0.25 539 501		
Observations	113		
	Coefficients	P-value	P value
Intercept	0.28086722	0.00134064	Significant
Stock (Dummy)	-0.00601692	0.93810448	Not
Cash/ Stock per share (%)	0.03478109	0.58082506	Not
2010 (Dummy)	-0.06422034	0.42513167	Not
2011 (Dummy)	-0.02998174	0.71331419	Not
ROA Acquirer/Target	6.184E-05	0.38292882	Not
Premium to 1-Day Avg Px (%)	-0.01010687	0.00036599	Significant
Premium to 1-Week Avg Px (%)	0.00356482	0.45501279	Not
Premium to 1-Month Avg Px (%)	0.01109722	0.00929312	Significant
Premium to 90-Day Avg Px (%)	-0.00421683	0.02524256	Significant
Deal price (th. euros)	8.5703E-05	0.41745793	Not

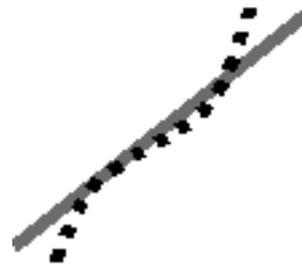


Figure 4. Long tails of normal probability plot*

* Normal Test Plot, Scymark.com. At: http://www.skymark.com/resources/tools/normal_test_plot.asp

the normal distribution. We will eventually make a plot that we hope is linear.

The resulting plot is shown on the graphs in Figure 5 and trend line is also presented. If the data do not fall in a straight line, then we cannot assume that the data follows a normal distribution. The normal probability plot for the non-normal histogram is shown below in Figure 4. It should be noted that it tails like an S at one side or both side as in Figure 4. This is often typical of distributions that are not normal.

Figure 4 represents Long Tails — A curve which starts below the normal line, bends to follow it, and ends above it indicates long tails. That is, more variance is seen than one would expect in a normal distribution. Normal Probability Plots of data of

models is presented in Figure 5 and it is seen that the distribution is nonlinear and has long tails.

The result of the projected linear trend line is not acceptable since it does not explain tails. The trends can be similar to moving average. We can make the following conclusions from the above plot.

1. The normal probability plot shows a non-linear pattern.
2. The normal distribution is not a good model for these data.

Linear relationships that are not evident using an untransformed form of 'Lifetime Giving' may be rendered detectable after transformation. So, in short, we transform variables in hopes of improving the overall model, which after all is a linear model.

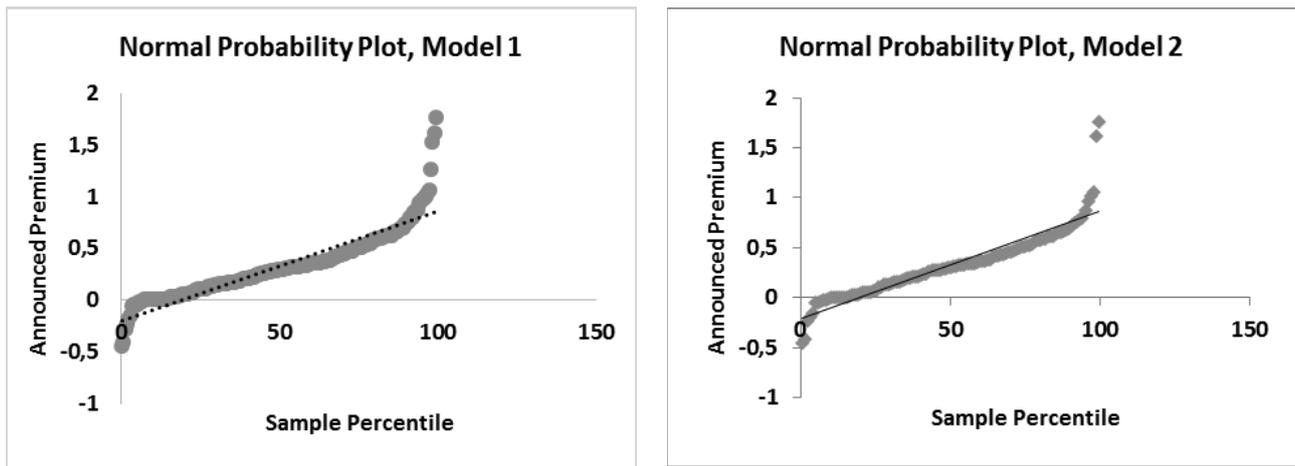


Figure 5. Normal Probability Plot of Model 1 and Model 2

One of the options could be to use logarithm model. Our goal in transforming variables is not to make them more pretty and symmetrical, but to make the relationship between variables more linear. Ultimately we want to produce a regression equation which both characterizes the data and meets the conditions required for accurate statistical inference.

Logarithmic Model 3 is used:

$$\ln\left(\frac{TV}{(1+PP)} \times PP\right) = \ln(\text{Targ EBITDA}) + \ln\left(\frac{\text{Ln Prem Cash}}{CAR}\right) + \text{Cash} + \text{Friendly},$$

where: *PP* – premium paid.

This is logarithm model. The variables of the model are presented in Table 4.

R2 of the model is 0.2649, meaning that this model describes only 26.49% of the variance in the premiums paid. F-test shows that the model is significant. P-value test shows that only few coefficients are significant at 15% confidence level:

- Intercept.
- Ln Target EBITDA is significant.

According to the regression, the coefficient for target EBITDA is elasticity coefficient and the increase in Target EBITDA by 1% lead to 0,484% increase in Premium paid.

Table 4.

Model 3. Logarithm model (Log-Log)

Regression Statistics			
R Square	0.26496105		
Adjusted R Square	0.24407927		
	<i>Coefficients</i>	<i>P-value</i>	<i>P-value</i>
Intercept	2.10663033	0.00017 019	Significant at 15%
LN (Target EBITDA mln euros)	0.48407662	3.4737E-12	Significant at 15%
Ln (Premium cash/offer price)	-0.00625855	0.88141013	Not
Cash (Dummy)	0.18446566	0.54499487	Not
Friendly (Dummy)	-0.35171654	0.47412195	Not
2010	0.17025218	0.6369686	Not

Normal Probability Plot

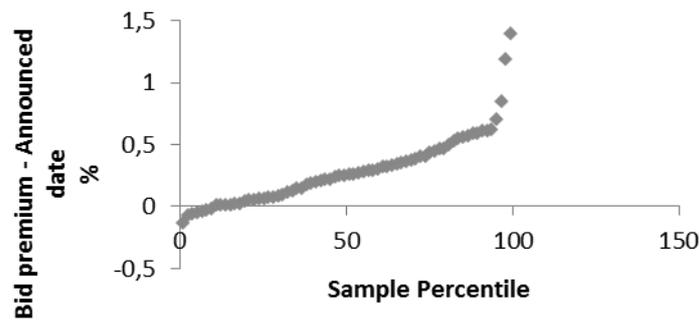


Figure 6. Normal Probability Plot, Model 3

Table 4

Payment type in Russian deals

Method of Payment	Number of deals in the sample
Undisclosed	64
Cash consideration	64
Stock consideration	1

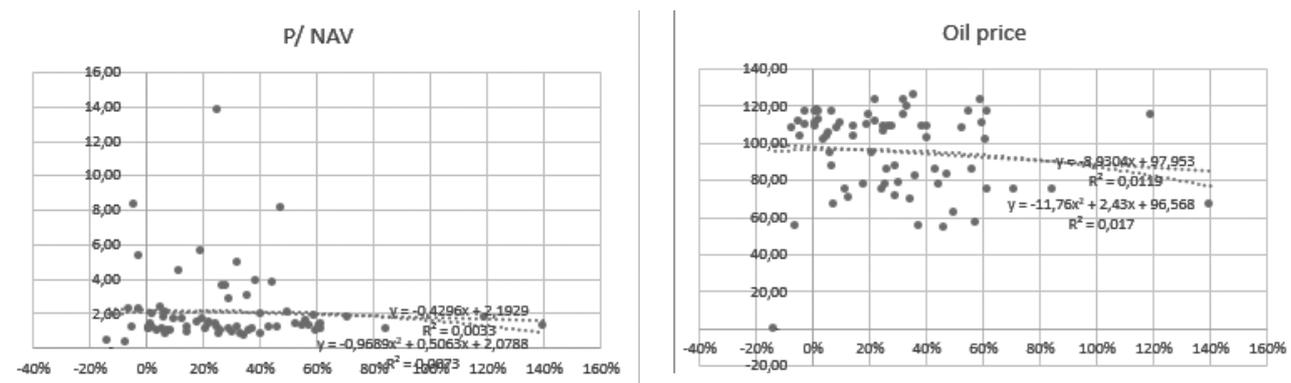


Figure 7. Distribution of P/NAV and Oil price for premium paid

In the logarithm model the distribution becomes more linear, which is more preferable. It is seen in Figure 6.

Russia. As far as Russian deals are concerned, about 49% are cash deals, 49% are undisclosed and only 6 deals have enough data among 130 deals, as premium is calculated based on target price.

In addition, most all Russian deals lack data. Many buyers are individuals and targets are private companies, which make it impossible to gather all the necessary data for the models.

Second step is investigating the impact of multiples on the premium. The distribution of the multiples is presented below:

Model 4 is connected with variables: P/E, P/CF, P/NAV, P/Assets.

R2 of the model is 0.3553 meaning that this model describes only 35.53% of the variance in the premiums paid. F-test shows that the model is significant. P-value test shows that only few coefficients are significant at 20% confidence level. The offer price in local currency and Target stock price prior to announcement are significant and together with Oil price and Gas price from Henry Hub explain 14,9% of the variance of the model.

The third step is connected with investigating the impact of multiples on the Upstream companies, Exploration and production companies. The data is obtained from the Zephyr and it is the partial sample of companies from Second step. The model has been built to find the best to describe the variance of the premium paid.

Table 5

Model 4. Multiples, announced premium in %

SUMMARY OUTPUT			
R Square	0.355221		
Observations	70		
	<i>Coefficients</i>	<i>P-value</i>	<i>P-value</i>
Intercept	17065716	0.178959	Significant
P/E	973550	0.146568	Significant
P/CF	-866,783	0.000222	Significant
P/ NAV	539923,8	0.331657	Not
P/ Assets	-457 106	0.788 822	Not
EV/ EBITDA	-63473,1	0.343604	Not
Oil price \$/bbrl	-124913	0.199143	Significant
US Henry hub	35257,01	0.98133	Not
Target share acquisition \$/ mln btu	-195341	0.955274	Not
Cross border (Dummy)	-3547904	0.302873	Not
2010 (Dummy)	-4901280	0.20822	Significant
2011 (Dummy)	2817086	0.331967	Not
2015 (Dummy)	63172,32	0.990859	Not

The sample includes 48 upstream oil and gas company. To test against multiples and coefficients in the previous step two models was tested: linear model and logarithm. Since logarithm can be taken only from positive numbers, only 24 deals satisfy this condition.

Model 5 uses the data for premium as value in thousands euros. Here we also apply logarithm model, as the distribution of data is non-linear.

The results of the regression are presented in table 9. It is seen that simple model explains 51% ($R^2 = 0.51$), logarithm model explains 56% ($R^2 = 0.56$) variance of the model. F statistics is significant at 10% significance level.

The interesting feature of these two models is that in linear model P/CF and % of gas are significant, while they are not significant in the linear model.

So, the model is:

$$\ln PP = 41,17 + 3 \ln \frac{P}{NAV} - 1,2 \ln \frac{EV}{BOED} + 1,5 \ln \frac{P}{2P} - 5,37 \ln \text{Oil price},$$

where: PP – premium paid.

It is double logarithmic model (log-log): $\ln Y = \beta + \beta_1 \times \ln X$, where $\beta_1 \approx \% \text{ growth with an } Y \text{ by an increase in } X \text{ by } 1\%$. This formula is a point elasticity of Y with respect to X .

The elasticity of P/NAV is 3 and if P/NAV increases by 1%, Premium increases by 3%, the increase of EV/BOED by 1% lead to decrease of Premium by 1.2% and increase of P/2P lead to increase by 1.5% in premium, while oil price lead to decrease by 5.37%.

This model explains 56% of the impact of the premium paid. It should be noted that multiples P/NAV, EV/BOED, P/2P are important for oil and gas sector.

IMPAIRMENT OF GOODWILL IN 2010–15 (IN RUSSIA AND ABROAD)

Impairment expenses occur in the oil and gas industry when the current carrying value of a company's oil and gas properties, for any given technical or economic reason, can no longer be recovered under present conditions. The dollar amount of goodwill impairment recorded by U. S. companies rose 18% to \$26 billion in 2014, with impairments in the oil and gas industry increasing dramatically, according to a report from Duff & Phelps¹⁴.

In addition to modifying operational and growth strategies, the decline in oil prices has ramifications for companies' financial statements and tax planning. An important consideration for companies is potential impairment of assets, including goodwill. Upon the occurrence of a business combination, goodwill is typically recorded on the balance sheet. Goodwill represents the excess of the purchase price of a business combination over the Fair Value of the net assets acquired. For publicly traded companies and private companies, goodwill is an indefinite and long-lived asset and is not amortized. Rather, goodwill is tested for impairment, at least annually. Goodwill impairment testing standards are governed by ASC Topic 350-20-35, Goodwill – Subsequent Measurement, and ASC 820, Fair Value Measurement.

¹⁴ Heller, M. Oil & Gas Sees Steep Rise in Goodwill Impairments, CFO.com, November 18, 2015. At: <http://ww2.cfo.com/accounting/2015/11/oil-gas-sees-steep-rise-goodwill-impairments/> (data: 21.05.2016)

Indeed, large impairments rocked many U. S. companies' income statements at year-end 2014 and in 2015. The major cause of most of these impairments was the fall in global commodity prices in the final quarter of the year. This is the conclusion of a study looking into asset impairments using the annual data of 72 U. S. oil and gas companies¹⁵.

The data for the research was the same as in the third step of empirical study. The sample includes 48 deals from E&P sector.

As evident from the Figure 8 and from the Table 7, the goodwill has been impaired by many companies. Among 48 deals 47 deals have recorded impairments. And after that the 15 acquirers have impaired the goodwill partially or fully. The impairment of goodwill is higher in 2012–15, which goes in line with industry trends and with the fall in oil prices.

Model 6 Goodwill investigates the impact of various factors on the impairment of goodwill. The goodwill is regressed across some factors. The deals from the sample that had impairment of goodwill are presented in Appendix 1.

We assume that the model is reliable since the model has passed R^2 test and F-test. R^2 for Model of goodwill equals to 39.36% and it explains 39.36% of the variance, which is quite low, however we did not take into account inner company factors after the acquisition and overall

¹⁵ Young, M. Low Oil & Gas Prices Result in Major Asset Impairments Across the U.S. 24.03.2015. At: http://blog.evaluateenergy.com/low_oil_gas_prices_result_major_impairments_in_us.

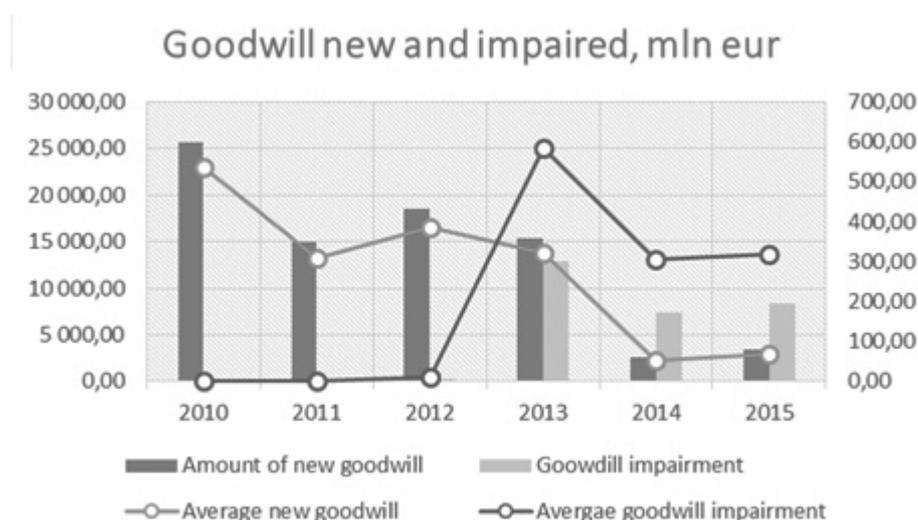


Figure 8. Goodwill new and impaired, mln euros

Table 7

Goodwill. Sample

	2010	2011	2012	2013	2014	2015
Amount of new goodwill mln euro	25708,86	14895,00	18576,80	15395,00	2599,00	3363,98
Average new goodwill mln euro	535,60	310,31	387,02	320,73	54,15	70,08
Number of deals	9	10	5	6	8	9
Goowdill impairment mln euro	0,00	0,00	235,40	12840,41	7364,00	8317,65
Average goodwill impairment mln euro	0,00	0,00	12,39	583,66	306,83	319,91
Number of deals impaired	0	0	1	2	5	7

Table 8

Model 6. Goodwill impairment

SUMMARY OUTPUT. Goodwill impairment			
R Square	0.393 619		
Observations	48		
	<i>Coefficients</i>	<i>P-value</i>	<i>P value</i>
Intercept	-4742,94	0.039044	Significant
Bid premium – Announced date %	6,305 914	0.746786	Not
Goodwill on acquisition m	0,116 051	0.137537	Significant
Deal value th EUR	-5,7E-05	0.099331	Significant
P/CF	-0,06 466	0.276664	Not
P/ NAV	-64,5788	0.589575	Not
EV/ BOED	-0,00 013	0.686979	Not
P/ 2P MMBOE	-0,03 833	0.974436	Not
EV/ EBITDA	14,61 603	0.319198	Not
%gas	1690,48	0.104533	Significant
Oil price	23,70 111	0.128385	Significant
US Henry hub	329,1193	0.364473	Not
Target share acquisition	2389,593	0.230145	Not
Control	-927,473	0.33597	Not
Cross border	399,4124	0.722791	Not
Losses of the target	653,2435	0.36967	Not

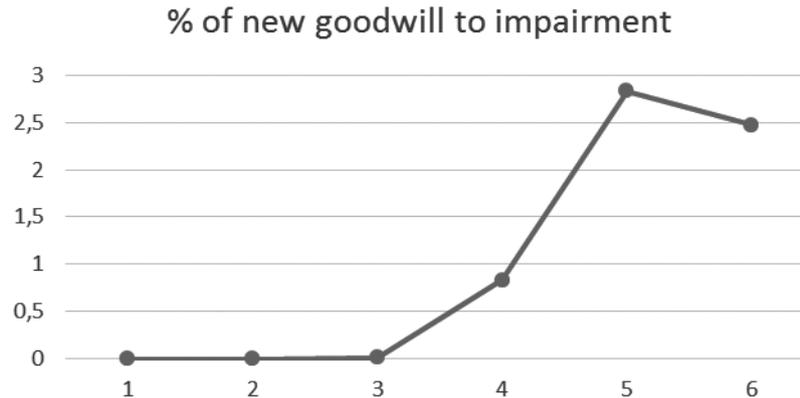


Figure 9. % of new goodwill to impairment

economic factors in oil and gas industry. Only few variables have passed P-value test, meaning that some variables should be excluded from the model. The final model is presented below:

$$GI = -4742,94 + 0,116051 \times \text{Goodwill on acquisition mln} - 0,0000575 \times \text{Deal value th EUR} + 1690,48 \times \% \text{gas} + 23,70111 \times \text{Oil price},$$

where: GI – goodwill impairment.

According to the model goodwill on acquisition's increase shows impact positively, deal value increase shows negative impact, % of gas increase also shows positive impact, oil price increase affect positively. The reason behind negative impact of deal value is that in large deals there is high probability of overpayment which leads to overstated goodwill and later impairments.

The energy sector was particularly hard hit, with the amount of goodwill impairment nearly tripling in 2014 to \$5.8 billion, primarily due to charges taken in the exploration and production sector.

CONCLUSIONS

Investigating the impact of deal characteristics on the premium paid and on the goodwill impairment. The period is limited from January 1, 2010 to December 31, 2015. Another important filter is share of the acquirer after the deal – it should be more than 10%, since otherwise it would be treated as minority purchase. Using only completed deals we thus narrowed the sample to 182 deals from Bloomberg and 90 deals from Zephyr database. The deals are from all subsectors of oil and gas sector. Only 48 deals were investigated for the goodwill impairment, with many multiples.

The significant model for premium paid was created for the Upstream sector for sample of 24 deals, since it is logarithm model. The model explains 56% of the impact of the premium paid. It should be noted that all three multiples are important for oil and gas sector.

$$\text{Ln Premium} = 41,17 + 3 \text{Ln} \frac{P}{NAV} - 1,2 \frac{EV}{BOED} + 1,5 \text{Ln} \frac{P}{2P} - 5,37 \frac{P}{NAV} \text{Ln Oil price}.$$

Among 48 deals 47 deals have recorded impairments. And after that the 15 acquirers have impaired the goodwill partially or fully. The impairment of goodwill is higher in 2012–2015, which goes in line with industry trends and with the fall in oil prices.

Appendix 1.
Impairment of goodwill

Acquirer name	Target name	Acquirer country code	Target country code	Announced date premium	Completed date	Bid premium – Announced date %	Deal value mln EUR	Goodwill impairment mlnEUR	Goodwill on acquisition mlnEUR
Statoil asa	Brigham exploration company	NO	US	14.10.2011	08.12.2011	20,22%	3503,53	8400	6687,00
Avenir diversified income trust	Great plains exploration Inc.	CA	CA	21.09.2010	05.11.2010	30,39%	58,93	5179	23424
Freeport-mcmoran copper & gold Inc.	Plains exploration & production company Lp	US	US	04.12.2012	31.05.2013	38,70%	12533,07	1700	1916,00
Denbury resources inc.	Encore acquisition company	US	US	30.10.2009	10.03.2010	34,88%	3308,30	1000	1061,00
Apache corporation	Mariner energy Inc.	US	US	14.04.2010	10.11.2010	44,93%	3101,05	862	863
North america holdings ii Inc. + bhp billington	Petrohawk energy corporation	US	US	13.07.2011	26.08.2011	61,93%	10506,75	994	3 591,00
Whiting petroleum corporation	Kodiak oil & gas corporation	US	CA	11.07.2014	08.12.2014	– 2,51%	4883,22	874	875,00
Noble energy Inc.	Rosetta resources Inc.	US	US	08.05.2015	20.07.2015	37,77%	3598,10	779	163,00
Sandridge energy Inc.	Arena resources Inc.	US	US	01.06.2010	16.07.2010	7,31%	1026,12	235	234,46
Pacific rubiales energy corporation	Petrominerales Ltd.	CA	BS	27.09.2013	28.11.2013	52,99%	1 112,31	116	50,00

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