AIEE ASSOCIAZIONE ITALIANA ECONOMISTI DELL'ENERGIA

the Italian Affiliate of the IAEE International Association for Energy Economics

"Drivers of Mergers and Acquisitions Transactions in The U.S Upstream Oil And Gas Industry"

Şevkat Özgür

Faculty of Business, Economics and Statistics

University of Vienna

5th AIEE Energy Symposium

Current and Future Challenges to Energy Security, energy perspectives beyond COVID19

in cooperation with SDA Bocconi, School of Management, Sustainability Lab

Milan, 16. December 2020

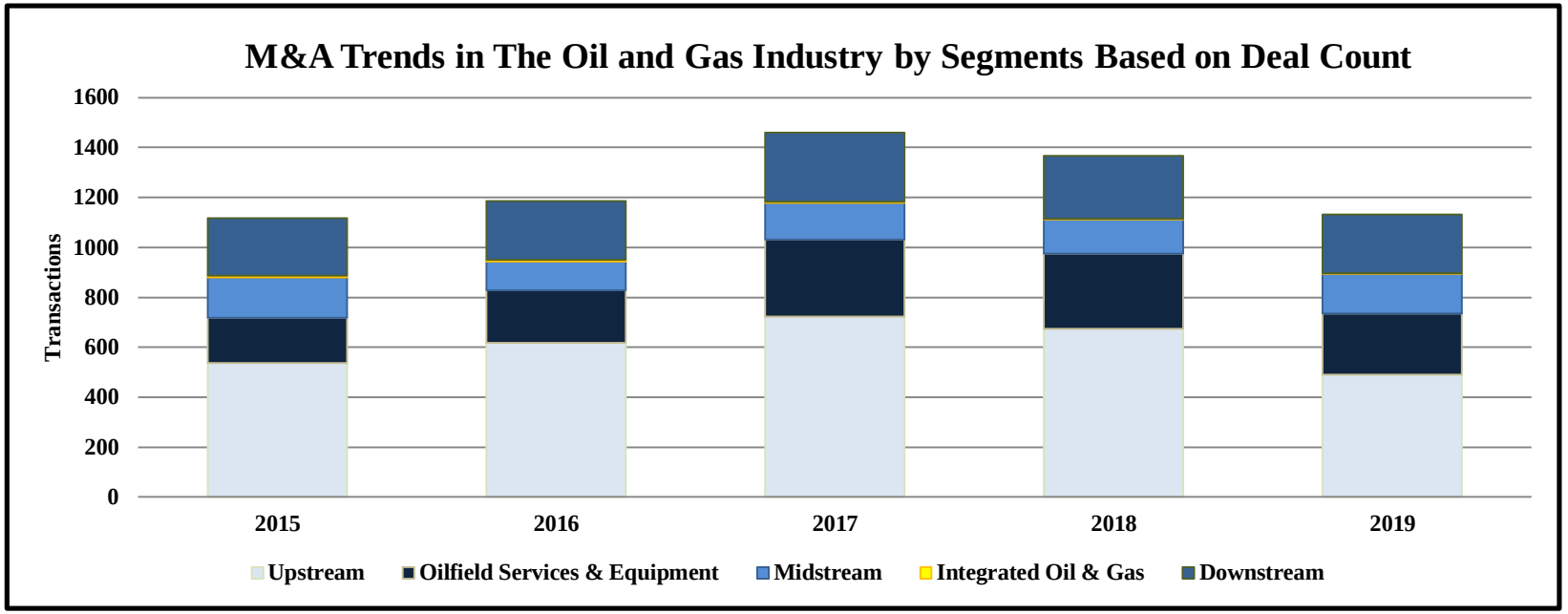
universität wien

Outline

- Oil and gas industry has an essential impact on the global economy.
- Oil and gas demand/supply balance and sufficient investment is crucial topic for further development in the oil and gas industry (IEA, 2018).
- To a firm in the oil and gas industry, upstream investment is an important goal, replacement of reserves, field recovery is considered as a key factor for future growth.
- Attempts to explain oil and gas investments, its underlying motivation and drivers face a challenge due to the complexity of oil and gas industry.
- Previous literature: Interdisciplinary research of mergers and acquisitions. However, academic studies of extracting and oil and gas industry is scarce in recent years (Hsu et al., 2017).
- **Motivation:** To provide broader view on upstream M&A transactions and its motivating facts by adding theoretical and industry-specific perspectives.

universität wien

Status quo – Upstream transactions are increasing in oil and gas M&A market



Source: IHS Markit, Transactions Analysis Database, 2019.

- The challenges of reserve replacement, pursuit of cost efficiencies, higher cost of debt, pressure for capital discipline by investors, the changing market conditions and technological advancements trigger M&A activity in upstream industry (IHS Markit, 2019).
- The U.S is in the epicenter of global O&G M&A market. For instance, increasing domestic M&A transactions in recent years.
- What drives oil and gas M&A transactions?
- **Which factors motivates upstream oil and gas M&A transactions in the U.S?**

universität wien

Literature I

- M&A transactions in general are impacted by technological, regulatory, economical, and industrial changes or shocks (Harford, 2005)
- The motives and underlying facts of M&A can vary across industries (Kang and Johannsonn, 2000; Hsu et al., 2017)
- A distribution of the geographical risks, the command of several skills, costs for operation units, rising stock prices, commodity prices, technological advancements, changes of industry-specific indicators make M&A strategy essential for oil and gas companies (Corlay and Hubby, 2012).
- The oil and gas M&A transactions are mainly driven by industry-specific indicators, sectoral changes, political events (Berntsen et al., 2018; Hsu et al., 2017; Ng and Donker, 2013).

- Inconclusive and heteregoneous findings of M&A in general.
- Industry-specific M&A studies and empirical evidence is rare.
- Recent studies encourage further empirical demonstration in the oil and gas M&A

universität wien

Literature II & Intended Contribution

Study	Key Findings
Hsu et al. (2017)	✓ The relationship between M&A deal counts between 2004 and 2013 in the U.S and industry-specific and macroeconomic indicators. ✓ The most significant impacts on M&A deal counts are the O&G production growth and oil price. ✓ Capital market and stock market performance show no significant impact on M&A deal counts.
Ng and Donker (2013)	✓ Canadian O&G transactions between 1990 and 2008. ✓ Reserves are negatively associated with takeover value: low reserve measures are associated with high takeover value. ✓ Oil price is shown to cause takeover activity. At the same time, takeovers shown to cause changes of natural gas prices
Dowling and Vanwalleghem (2018)	✓ Gulf Cooperation Council M&A deals between 2002 and 2014. ✓ No significant relationship between economic measures and M&A, e.g., GDP growth is insignificant. ✓ Higher governance and cultural similarity attracts more M&A transactions.

Contribution by empirical research: I) Assessing the association between the U.S upstream M&A transactions in terms of deal counts and value from the sector-specific, macroeconomics, political and technological changes perspectives. **II)** Sub-analysis for various patterns of upstream transactions (For instance; asset versus corporate deals, conventional and unconventional deals).

Methodology and Data

- **Data:** Upstream oil and gas M&A transactions in the U.S (IHS Markit, Transactions Database, https://connect.ihs.com/home)
- **Period:** 2000 – 2019
- **Deal Types:** Acquisitions, mergers, acquisition/farm-in, acquisition/joint venture
- **Sample:** Domestic upstream transactions across 11 regions in the U.S (N= 4132 deals)
- **Model:** 1) Poisson regression for analysis based on M&A deal counts 2) OLS regression for analysis based on M&A deal value

1) $$LN(Y_{it}) = \beta_0 + \beta_1 X_{it} + \cdots + \beta_j X_{jt} + \gamma_i + \varepsilon_{it}$$

- **Dependent variable:** M&A Deal Counts per aggregated region level per year

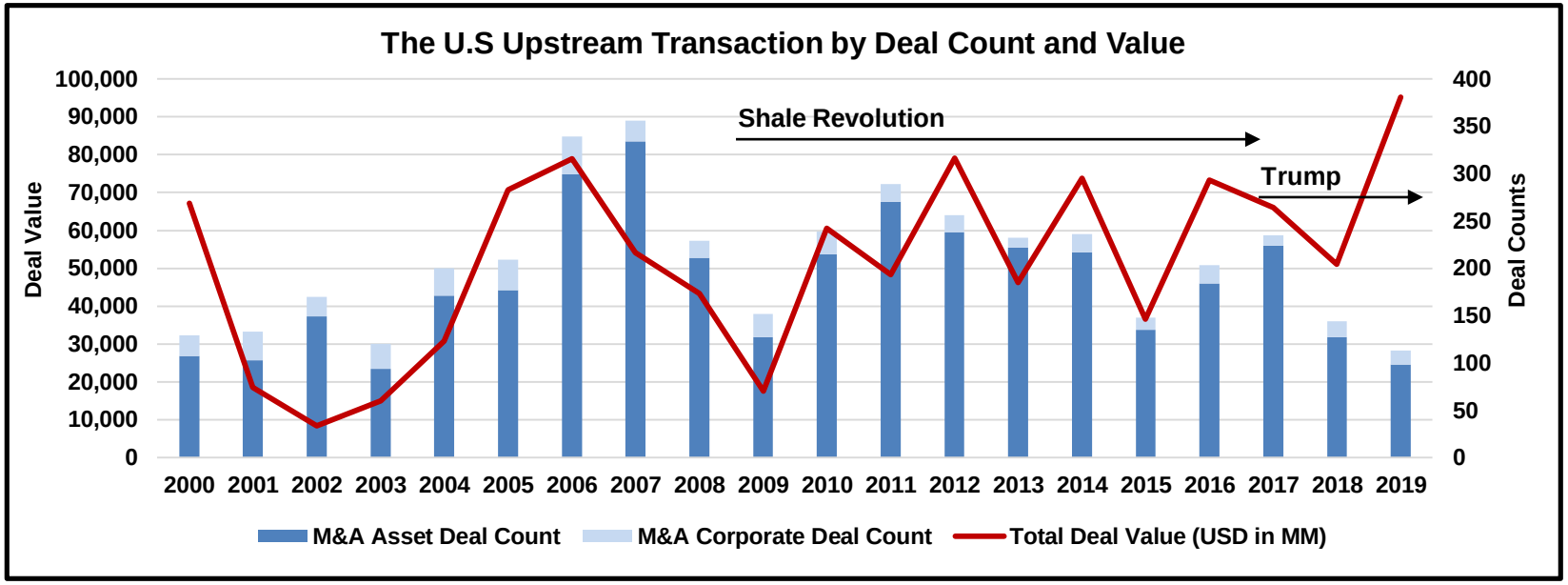
- **Independent variables:** O&G production growth, oil and natural gas price, S&P 500 index price, interest rate spread (FRED CPFF)
- **Dummy variables:** Shale revolution, Trump's election and administration

2) $$Y_{it} = \beta_0 + \beta_1 X_{it} + \cdots \beta_j X_{jt} + \gamma_i + \varepsilon_{it}$$

- **Dependent variable:** M&A Deal Values per aggregated region level per year (N=2136 deals)

universität wien

Results I: Upstream Transactions

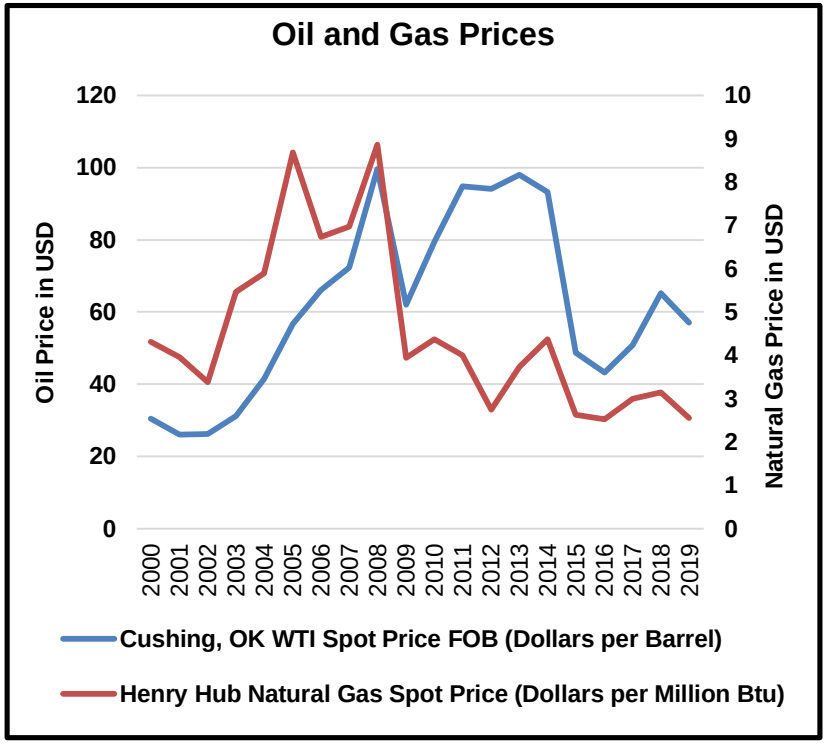


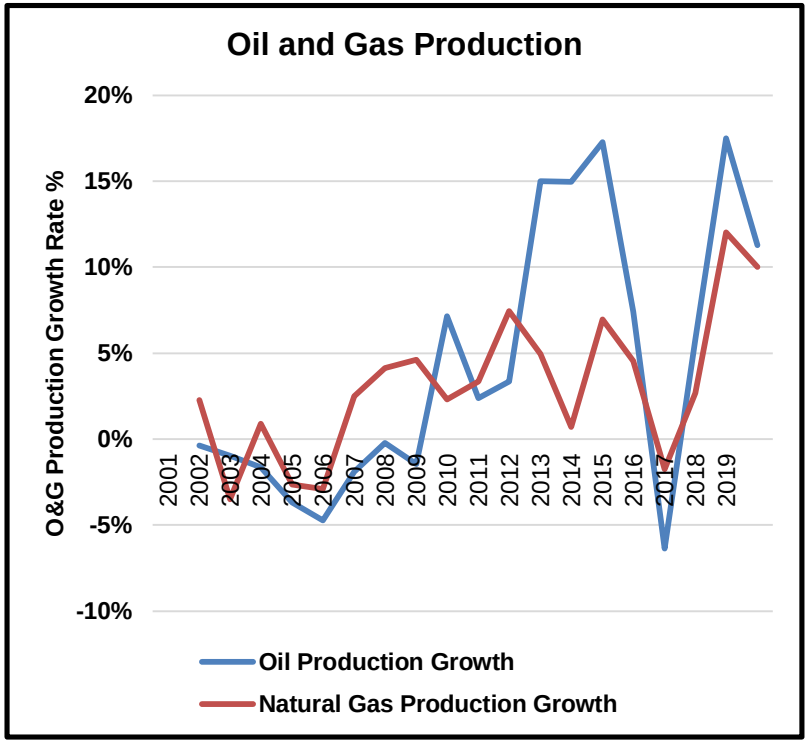
Source: Own depiction based on IHS Markit, (Connect).

- The recent trends show signs for concerns on **gaining asset ownership, asset reallocation and combination.**
- **Challenge of Upstream** → high financial risk with high return, regulated industry, impacted by global politics and high technology intensive industry, new drilling techniques in the U.S.
- **Organic growth** is more expensive than M&A transactions.
- Can we see the impact of Shale revolution or Trump's administration?

universität wien

Results II: Oil and Gas



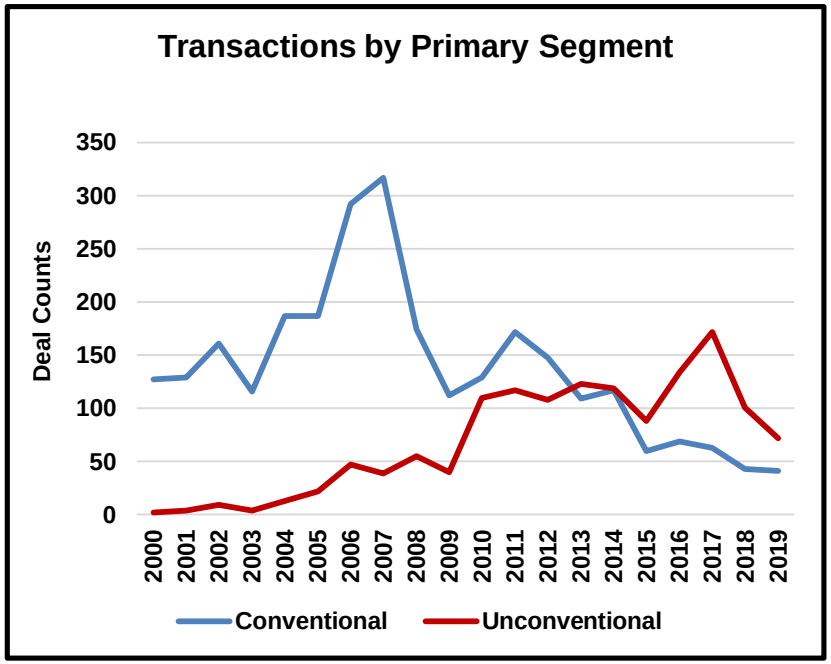


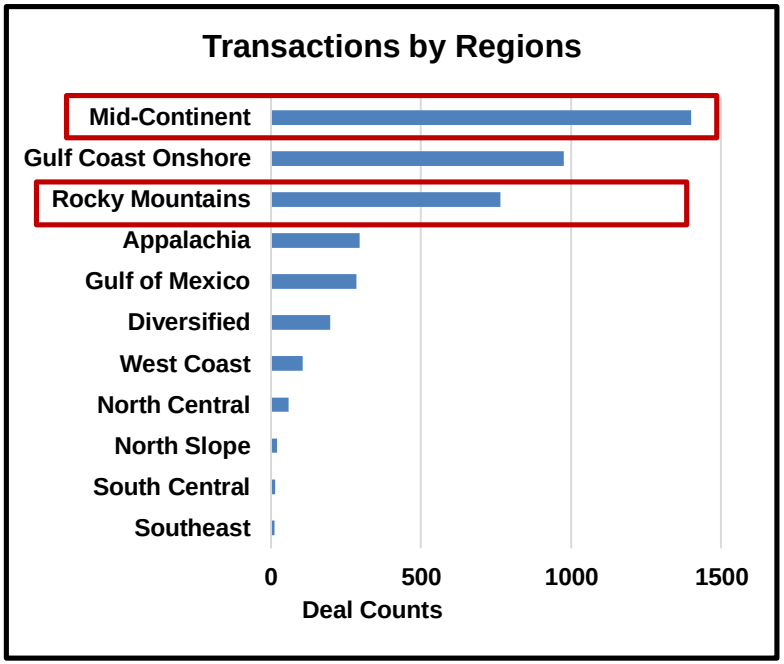
Source: Own depiction based on data from the U.S IEA.

- **Rapid increase of oil & gas prices** until financial crises, similar patterns with M&A activity.
- Negative oil ang gas production growth for the first decade, strong change after 2009.

universität wien

Results III: Patterns





Source: Own depiction based on IHS Markit, M&A Transactions Data Sample.

- Shale oil and gas revolution show no tredemonous impact on M&A transactions yet
- Mid-Continent, Rocky Mountains and North regions have increasing unconventional investments

universität wien

Result IV: Summary of Empirical Evidence

Analyses	Key Findings
Dependent variable: M&A Deal Counts	✓ Negative and statistically significant association with interest rate spreads and O&G production growth ✓ Positive and statistically significant association with oil price but no significant impact of natural gas prices ✓ No significant impact of S&P 500 Index, but pointing to positive side. ✓ No significant impact of Shale revolution and Trump's administration
Dependent variable: M&A Deal Counts per Asset vs. Corporate Deals	**Asset deals:** ✓ Negative and significant association with interest spreads and O&G production growth ✓ Positive and significant impact of oil price ✓ Other variables show no significant impact **Corporate deals:** ✓ Only Shale revolution has a negative and significant association with corporate M&A deal counts
Dependent variable: M&A Deal Counts per Unconventional vs. Conventional	**Conventional deals:** ✓ Negative and significant association with interest rate spreads, oil production growth and shale revolution ✓ Positive and significant impact of O&G price **Unconventional deals:** ✓ Negative and significant association with O&G production growth ✓ Positive and significant impact of O&G prices ✓ Trump's administration has a positive impact

Dependent variable: Overall M&A Deal Value surprisingly has no significant association with the independent variables.
Only oil production growth has a negative and significant impact on M&A deal value, per asset and unconventional deals
Oil price has a positive association to M&A value and statistically significant with asset M&A deal value.

universität wien

Conclusions

- Upstream M&A transactions requires broader perspectives, more than common economic explanations.
- Study offers a specific sector-focus contribution to M&A literature.
- Extension to Hsu et al. (2017)
- There is a stronger association between upstream oil and gas M&A activity and industry-specific indicators, macroeconomic indicator.
- However, the impact of stock market performance is somehow not strong. Stock prices and M&A activity have historically shown a tight correlation, particularly in the US. However, stock performance has no significant impact on upstream M&A activity, but overal pointing to the positive side.
- Overall politics, technological and industry-specific changes has a limited effect. For instance; Trump's election and administration. On the other hand, time frame is limited and the real impact should be tested for further conclusive arguments.
- Shale revolution has no significant impact, except for corporate and conventional deals.
- Upstream oil and gas industry M&A activities in the U.S respond more to oil and gas production declines than to hikes. (assymetric response to oil and gas production growth rate)
- The analysis of M&A deal value captures limited information or not at all, missing data might limit us.

universität wien

Critical reflection/Future Work

- Analysis only gives a first insight into various patterns and influencing factors without the claim to be complete.
- Further analysis is required.
- Consider to test the lagged effects of variables on another variable (e.g. 1 year change, all independent variables are lagged-lengths).
- Extension of the sample or collect/merge information on M&A deal value.
- Further research to check whether the conditions are driven by specific region.
- Paris Agreement, Trump vs. Biden's administration and changes in future.
- Climate change, uncertainties, Post-Covid-19 analysis

universität wien

Discussion

Faculty of Business, Economics and Statistics
Oskar-Morgenstern-Platz 1, 1090 Vienna, Austria

Sevkat Özgür

T: +43-0-664-8385906
E-mails: sevkato25@univie.ac.at

https://www.univie.ac.at/

universität wien

Back-Up

Variables	[1]	[2]	[3]	[4]	[5]
Annual FRED CPFF	**-0.896*** **	**-0.934*** **	-0.422	**-1.462*** **	**0.719*** **
	(0.166)	(0.175)	(0.380)	(0.151)	(0.232)
S&P 500 Index Price	0.000219	0.000267	-2.94e-05	-1.18e-05	**0.000730** **
	(0.000195)	(0.000195)	(0.000306)	(0.000203)	(0.000133
Oil Production Growth	**-3.245*** **	**-3.558*** **	-0.908	**-2.844*** **	**-4.298*** **
	(0.394)	(0.414)	(0.781)	(0.693)	(0.642)
Natural Gas Production Growth	**-2.074*** **	**-2.539*** **	2.166	-0.532	**-5.101*** **
	(0.438)	(0.566)	(1.665)	(0.484)	(1.010)
WTI Oil Spot Price	**0.0173*** **	**0.0198*** **	-0.00260	**0.0138*** **	**0.0355*** **
	(0.00210)	(0.00248)	(0.00436)	(0.00242)	(0.00299)
Henry Hub N. Gas Spot Price	-0.00129	-0.00844	0.0517	**0.0861*** **	**-0.294*** **
	(0.0191)	(0.0172)	(0.0429)	(0.0172)	(0.0363)
Shale Revolution	-0.136	-0.135	**-0.272** *	**-0.354*** **	-0.0368
	(0.138)	(0.149)	(0.165)	(0.129)	(0.162)
Trump	0.0989	0.120	-0.160	-0.230	**0.240** *
	(0.154)	(0.156)	(0.339)	(0.261)	(0.139)
N Observations	180	180	180	180	180
Primary Regions Fixed Effects	yes	yes	yes	yes	yes
Number of Primary Regions - n	11	11	11	11	11

*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: M&A Deal Count

[2] M&A Deal Count per Asset
[3] M&A Deal Count per Corporate
[4] M&A Deal Count per Conv.
[5] M&A Deal Count per Unconv.

universität wien

Back-Up

Dependent Variable: M&A Deal Value

Variables	[1]	[2]	[3]	[4]	[5]
Annual FRED CPFF	-954.7	-431.2	-1,338	-2,398	**-1,633****
	(763.4)	(466.6)	-1,903	(2,015)	(613.8)
S&P 500 Index Price	0.395	0.325	0.236	1.128	0.403
	(0.351)	(0.181)	-1.190	(1.044)	(0.388)
Oil Production Growth	-1,681	**-1,226****	-1,82	-4,369	**-1,451****
	(1,717)	(501.4)	-4,993	(4,306)	(562.2)
Natural Gas Production Growth	-792.7	118.3	-665.7	251.3	1,233
	(2,683)	(675.2)	-11,239	(5,373)	-4,661
WTI Oil Spot Price	7.029	**7.132***	7.260	18.14	4.312
	(6.898)	(3.560)	(19.73)	(16.21)	(11.01)
Henry Hub N. Gas Spot Price	45.65	**-49.47***	132.6	-19.27	15.58
	(123.3)	(26.10)	(239.1)	(175.8)	(56.46)
Shale Revolution	-124.6	-328.6	595.3	-849.9	-353.0
	(524.7)	(266.0)	-1,484	(1,120)	(335.4)
Trump's Administration	544.6	52.56	2,326	1,284	-428.4
	(351.0)	(207.1)	-1,429	(913.7)	(315.8)
Constant	-630.2	-230.8	-414.2	-1,557	103.0
	(417.8)	(219.0)	-1,166	(1,381)	(735.5)
N Observations	165	161	109	158	87
Primary Region Fixed Effects	yes	yes	yes	yes	yes
Number of Primary Regions - n	11	11	10	11	7

*** p<0.01, ** p<0.05, * p<0.1

[2] M&A Deal Value per Asset
[3] M&A Deal Value per Corporate
[4] M&A Deal Value per Conv.
[5] M&A Value per Unconv.

universität wien