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Robert Bamford April 11, 2017

M&A in the US Energy Sector from 2010-2011:
Did M&A Prove Useful for Overall Equity Value?

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Abstract

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By Robert Bamford

This paper will investigate the effectiveness of mergers that occurred in the US energy sector between 2010 and 2011. The paper will look at what affects stock value of companies pre-announcement and post-completion of mergers. The paper will find that fixed asset total is the most important factor when identifying firms' stock return over the two years studied. Merger-related variables fail to identify value-add generated by the occurrence of a merger. However, firms that engaged in mergers tended to succeed in the long-run. This is largely explained by an inherent difference in the type of firm that enters into an acquisition rather than something attributable directly to a merger.

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Table of Contents

I.
Introduction

The energy industry in the United States carries much weight in the public spectrum. Its influence spans nearly every major industry and, directly or indirectly, impacts the lives of every citizen; the regulation and oversight of it are discussed hotly and frequently by the government; and it and its impact are covered regularly by the media. Further, the industry has undergone a notable amount of change recently.

Among other factors, two trends seem to be of particular interest and make the time between 2010 and 2011 fairly interesting. Firstly, the energy, specifically the oil and gas segment, saw significant change over the time period in question. During this period, the practice of fracking expanded significantly and experienced a resultant period of significant growth. The topic was heavily covered in the domestic and global news as it affected energy prices globally.

Secondly, at the time significant change in the alternative energy space were occurring in the United States. Along with rapid improvements to the efficiency and viability of renewable energy, 2010 and 2011 were years in which a number of government subsidies and funding alternative fuel sources, far exceeding a billion dollars-worth, began to take place. For this reason, 2010-11 was an interesting period for the energy industry.

Also, the sector's performance in this period has seen very little study in the literature. With these factors in mind, it would seem that this topic is worth investigating.

The time period was relatively active in the M&A space. Hence, it would be interesting to incorporate, along with other analysis of stock returns, study into the success of mergers and

acquisitions in this space. As the period was already one of both organic company growth and inorganic growth (i.e. through mergers and acquisitions), it will be interesting to see whether or not mergers and acquisitions were crucial to firms' stock returns during this period.

By means of background, mergers and acquisitions (the difference between the two is colloquial and irrelevant – they are often used interchangeably) can occur at two levels: the first is at the corporate level. A merger or acquisition at the corporate level typically means the taking over of an entire company's debt, equity, assets, etc. In other words, the one company absorbs or combines with another. The other is at the asset-level. A merger or acquisition at the asset level involves one company taking over one or multiple assets from another company. Unlike a corporate-level transaction, this differs in that it involves no transfer of the company's (e.g. an asset level transaction could involve company A buying some amount of machinery and drilling rights to an area from company B; company B would still exist as it was before, minus these select assets). In both cases, the acquiring company absorbs the acquired assets or company. Also, mergers are funded by money raised through the issuance of more stock, debt or a mix of both. In the energy space, mergers and acquisitions are typically asset-level and are usually funded with debt. Finally, when the paper references firm's returns, it references the fluctuation of the aggregate value of a company's stock.

In this paper, I intend to look at what drives returns in the energy industry; one of the main factors being looked at will be how mergers and acquisitions relate to stock values of companies.

Because of the changing landscape of the industry I decided to restrict my research to the time period of 2010-2011, and for multiple reasons, the main one being that most data for these smaller transactions is irregular and thus difficult to collect consistently, I restrict my study to mergers of over $100 million. This allows for the analysis to specifically investigate the industry

during the period with the aforementioned trends. 174 such mergers occurred over the relevant period.

The approach for this is an empirical one. I will regress a number of seemingly important factors, a number of which will involve merger activity, on stock returns. In order to measure the pre- and post-merger time periods, the data will be measured over these six periods: three, two and one months before the announcement of any merger and three months, one year and two years after the occurrence of the mergers.

In order to analyze the data, four separate regressions will be run:

(1) The data combined as a collection of both the before periods (one, two and three months pre-merger) and the post-merger periods (three months, one year and two years after the completion of the merger).

(2) The data as a multiple linear regression for only the period three months after the merger.

(3) The data as a multiple linear regression for only the period one year after the merger.

(4) The data as a multiple linear regression for only the period two years after the merger.

The overall regression (1) will allow the overall trends to be seen, while the regressions for the individual periods (2,3,4) are important for determining how the different variables change over time. Both are of interest in this paper, but the regressions for the individual periods prove to be more informative and interesting.

This paper will find that mergers and acquisitions in the energy industry over this time period have little statistically significant impact on firms. The increased post-merger return appears to be largely attributable to the acquiring firms being otherwise over-achieving firms.

In order, the paper will continue with: a section dedicated to a literature review and brief discussion related to how this paper fits in; a section discussing the methodology & data relevant to the study; the results of the regressions run along with analysis of said results; and finally a brief conclusion.

II.
Literature Review & Contribution

There is a sizable amount of literature regarding the Oil & Gas industry along with merger and acquisition activity in it. One of the most closely related paper written considers the motivating factors for mergers and acquisitions in a specific subsector of the United States oil and gas sector. In the paper, Hsu, Wright and Zhu (2013) attempt to pinpoint what upstream oil & gas companies look for in a possible acquisition target. They find that one of the main motivators of oil & gas-based mergers and acquisitions is overall oil and gas production. In an analysis of merger returns of Canadian oil and gas companies, a similar result was found by Boyer and Filion (2007). In light of this, I have made sure to incorporate United States energy exports, which is more easily attained data and should be fairly related to overall energy production, into my

research. Further, they found that industry-specific measure seemed more important than overall economic indicators in motivating mergers and acquisitions in the sector.

Also related is a study of Indian oil & gas companies by Trivedi, Desai and Joshi (2013). The paper found that in the short-term, financial performance was not aided by the use of mergers and acquisitions. Further and relatedly, mergers and acquisitions here were not shown to increase the performance of companies' stock. While this paper is fairly similar to the one in question, it is important to remember that the regulatory landscape, demand for, and composition of energy companies in India and the United States differ significantly; therefore, these results are by no means universal.

More broadly, one can find much written about the subject of mergers and acquisitions generally. Some papers discuss the characteristics of acquired companies. Shleifer and Vishny (2013), for example, argue that firms with overvalued stock attempt to improve the value of their stock through acquisition of undervalued assets. Similarly, it is discussed by Agarwal and Jaffe (2003) that takeover targets tend not to be underperforming companies, as is somewhat otherwise commonly believed. Also, whether the acquired company is public or private can impact the success of a merger, but according to Capron and Shen (2007), the returns seen in the acquisition of a private versus a public company depend on the purpose of the acquisition. In same- or similar-industry acquisitions, acquisition of private companies tends to be more fruitful and the opposite is true of acquisitions in industries that differ from the acquirer's core industry. Since the acquisitions in this paper are restricted to acquisitions of energy companies by energy companies, we would then expect most acquisitions observed in the data to be of private companies.

This paper is restricted to an analysis of public acquirers (for the sake of data clarity and availability), but one paper by Bargeron, Schlingemann, Stulz, and Zutter (2008) found that public acquirers tended to overpay for similar companies when compared with private acquirers. Nonetheless, this is not an obstacle for the paper since private acquirers are intentionally not studied in this analysis.

This paper, unlike the bulk of the energy sector-based literature currently in existence, focusses on the sector more broadly, as opposed to oil and gas specifically, and it focusses on a very specific time period that remains unstudied.

III.
Method, Data & Variables

The analysis will be done on the basis of regression results, as this is an empirical paper. Data collection was done through databases and government-sponsored websites (both reliable sources).

The company-level data (e.g. stock price, total assets) along with information on mergers and acquisitions was collected mainly from the Bloomberg database. An energy-specific sector index, which estimates the movement of the industry's equity as a whole, was downloaded from S&P, a prominent company that produces indexes such as this[1]. Further, export data was found

[1] Indexes typically function as follows: a small yet representative group of stocks are selected, and the stock values of each of the members are aggregated. The index can now be used to track change in an industry's equity value.

from the website of the EIA[2], a government agency dedicated to tracking and making available information and data regarding the energy industry.

As for the organization of the data, each company that engaged in a merger or acquisition between 2010 and 2011 was tallied and information was collected regarding announcement date of the merger (the day that a merger is announced to the public) and the completion date of the merger (after all the regulatory approvals and legal integration is complete). It is worth noting that these two dates tend to differ by around 4 months. Further, company-specific data was organized according to the time period from which it came. Also, a control group of companies that did not engage in mergers and acquisitions over the relevant period was gathered.

The data is panel data, organized into six different time periods. Each variable, corresponding with an individual company's merger timeline, is organized into one of the following periods: three months, two months and one month prior to the announcement of a merger or three months, one year and two years after the merger's completion. In other words, for each company, there are six sets of data, each corresponding to one time period and containing information for all the relevant variables.

The following regression was run (the description of the variables will be outlined below):

$$\textbf{Lfirm} = \beta_0 + \beta_1\textbf{*Lind} + \beta_2\textbf{*Tmd1} + \beta_3\textbf{* Isacquirer} + \beta_4\textbf{*Volatility} + \beta_5\textbf{* USEnergyExports} + \beta_6\textbf{*Lfxt} + \beta_7\textbf{* Lindtmd1} + \beta_8\textbf{*Lindacq} + \beta_9\textbf{* Debt}$$

[2] https://www.eia.gov/totalenergy/

Also the data was separated and reorganized as follows. Each post-merger time period was identified, and each company's data from each post-merger period was paired with data from the period one month prior to announcement. The following regression was then run for the periods three months, one year and two years post-completion of a merger:

$$\textbf{Lfirm} = \beta_0 + \beta_1\textbf{*Lind} + \beta_2\textbf{*Tmd1} + \beta_3\textbf{* Isacquirer} + \beta_4\textbf{*Volatility} + \beta_5\textbf{* USEnergyExports} + \beta_6\textbf{*Lfxt} + \beta_7\textbf{* Lindtmd1} + \beta_8\textbf{*Lindacq} + \beta_9\textbf{* Debt}$$

The variables analyzed are listed below:

- **Lfirm** is the log of the total equity value of a company at any given point in time. Looking at the change in this between any two periods gives firm returns.
- **Lind** is the log of the value of an index that approximates the value of the energy industry as a whole.
- **Tmd1** is a variable that separates pre- and post-merger time periods. It equals 1 for post-merger periods and 0 for pre-merger periods. All data for the control (i.e. non-merging) companies have this variable set to 0. The variable measures the difference in return between pre- and post-merger periods. It is expected to be positive since mergers are theorized to be valuable for firms.
- **Isacquirer** is a variable that separates firms that engaged in mergers from those that did not. It is set to 1 for acquirers and 0 for non-acquirers. The coefficient measures the difference between firms that chose to acquire and those that chose not to; it is expected to be zero.
- **Volatility** is a variable that estimates the recent short-term volatility of a firm's stock price
- **Lfxt** is the log of the fixed assets of a company. This is a decent proxy for firm size and production capacity.

- **USEnergyExports** represents the change in energy exports between any given periods.
- **Lindtmd1** is the interaction variable between Lind and Tmd1. This coefficient measures the market influence for post-merger periods only. It is expected to be positive.
- **Lindacq** is the interaction variable between Lind and IsAcquirer. This gives Lind for acquirers only. This coefficient measures the market influence on the acquirer group only. It is expected to be positive.
- **Debt** is the debt/equity ratio of each company. This is included as the ratio of debt to equity that a company holds should affect the willingness of investors to buy a company's equity.

The following section discusses the results of the regressions described above.

IV.
Results
(a) Overall

The regression showed the following results:

Overall

lfirm	Coef.	P>z
lind	1.187646	0.003
tmd1	1.957717	0.189
isacquirer	3.185993	0
volatility	-0.07851	0.058
usenergyexports	-0.24151	0.081
lfxt	0.694445	0
lindtmd1	-0.31222	0.164
lindacq	-0.00014	0.814
debt	1.31E-06	0.699
_cons	-8.03231	0.003

The regression shows increased returns in the group of merging firms. Part of this is largely attributable to a difference in the type of firms that merge while part appears to be a difference in performance during post-merger periods.

The isacquirer variable is positive and significant past the 0.1% level[3]. Thus, it appears that there is an intrinsic difference between the acquiring firms and the non-acquiring firms. Further, the coefficient on tmd1 variable, which allows for the difference between pre- and post-merger returns to be isolated, is statistically insignificant (tmd1's coefficient is estimated to be positive and only significant at the 20% level). Also, the lindtmd1 coefficient, which the index's addition effect on post-merger returns, is negative but insignificant at the 10% level. The lindacq and lindtmd1 variables have negative coefficients. It thus appears that the market treats merged firms differently than their non-merged counterparts. The regression here finds an effect due to mergers at the 20% significance level but not at the standard 10% level.

[3] As a note, given the disproportionate size of the group of merged companies compared to the non-merged companies in the control group, this likely leads to an overstatement of this variable's significance

With the most confidence, it shows that fixed assets are key drivers to returns; the larger the firm is in terms of tangible assets, the more successful it will be. According to the regression, for every 1% increase in fixed asset total, the company sees a 0.69% increase in total return. This is predicted with confidence past the 0.1% level ($z = 22.21$). Further, according to the results, overall industry success is important for return of companies. For every 1% increase in industry growth, the firms in question returned 1.19%. This is significant past the 1% level and is a fairly unsurprising result – it would be expected that firm returns are tied to their corresponding industry's overall return. Also, overall the volatility variable was deemed slightly negative and significant at the 10% level. It appears that during the 2010-2011 period, the market seemed to slightly favor less volatile firms. Energy exports were, interestingly, negatively correlated with firm-specific returns and statistically significant.

However, it is also informative to explore the results given in each post-merger period specifically in order to see how mergers affect value throughout the relevant sub-periods. The same regression as above was run for sub-periods of three months, one year and two years after the completion of the merger. The data for each sub-period consists of data from one post-merger period and from the period one month pre-merger.

(b) Period – 3 Months Post-Merger

The regression regarding the period 3 months past the completion of the merger shows the following:

Three Months After

lfirm	Coef.	P>z
lind	1.328932	0.693
tmd1	-1.09323	0.798
isacquirer	4.904901	0.188
volatility	0.065077	0.714
lfxt	0.931054	0
usenergyexports	0.87603	0.108
lindacq	-0.00135	0.775
lindtmd1	0.162344	0.801
debt	2.73E-05	0.662
_cons	-11.9386	0.594

As was the case with the initial regression, the fixed assets continue to exhibit a positive relationship with firm return; for every 1% increase in fixed assets, the regression predicts a 0.93% increase in firm return. United States energy exports were also an important and factor in this period; for every 1% increase in energy exports, the predicted return increased by 0.86%. The other factors tested in the regression here are all insignificant at the 20% level.

In this regression, there is little support for mergers and acquisitions benefitting companies. In fact, if anything, this suggests that mergers and acquisitions fail to aid the value of acquiring companies' stock. This is evidenced by the positive isacquirer coefficient, implying that, even without a merger, the companies that act as acquirers in these years already would experience returns in excess of those that did not engage in mergers. Further, the tmd1 variable, which is a rough indicator of post-merger success, is negative (though insignificant) here. Again, it is more likely in this time period that mergers saw negative returns when compared to the period one month before the merger.

In this period, we see the most statistical significance for lfxt (0.1% level). US energy exports comes second with significance at the 15% level but not at the 10% level.

It appears thus that firm returns are fairly difficult to estimate in the period three months after the completion of a merger. This appears to make sense since the effects of a merger are still relatively unrealized in the short period between completion and three months afterwards.

(c) Period – 1 Year Post-Merger

The regression regarding the period one year past the completion of the merger shows the following:

One Year After

lfirm	Coef.	P>z
lind	1.46781	0.477
tmd1	4.819574	0.57
isacquirer	5.261375	0.03
volatility	-0.08867	0.501
lfxt	0.946056	0
usenergyexports	0.283888	0.552
lindacq	-0.00162	0.585
lindtmd1	-0.74143	0.558
debt	7.08E-05	0.329
_cons	-12.9385	0.351

These results are somewhat different from those of the prior regression. When compared to the three-month regression, the coefficients for the volatility, tmd1, and lindtmd1 variables all show different signs than before. However, it is important to note that all of these variables are still statistically insignificant.

Fixed assets again were highly correlated with overall return in this period. For every 1% increase in fixed assets, firms over this time are estimated to have seen a resultant 0.95% increase in equity value.

The IsAcquirer variable here becomes significant, which is not true of the prior period. As with the previous timeframe, it has a positive coefficient, which indicates that there is an intrinsic difference between the firms that chose to acquire versus those that did not. Also, the lind coefficient is positive and insignificant. The resultant change in firm return due to a 1% fluctuation in the index here is given by the following:

$$1.468 - 0.002 * \text{isAcquirer}$$

This means that acquiring companies react in a slightly opposite direction when compared to non-acquiring firms, but this estimate does not carry strong statistical significance.

The energy exports variable, remains positive but has a heavily reduced significance in this period, which seems to be a bit surprising. One would likely expect a large scale economic factor such as energy exports to become more significant over longer periods of time.

Again, there is little support here for mergers benefitting companies in this period specifically. The explanation is similar to the one presented in the preceding subsection. However, given the change in sign for tmd1, the case is certainly weaker in this period.

(d) Period – 2 Years Post-Merger

The regression regarding the period 2 years past the completion of the merger shows the following:

Two Years After

lfirm	Coef.	P>z
lind	1.470069	0.259
tmd1	-1.2367	0.849
isacquirer	5.44502	0.001
volatility	-0.15855	0.242
lfxt	0.991229	0
usenergyexports	-0.14401	0.795
lindacq	-0.0016	0.404
lindtmd1	0.148347	0.878
debt	6.08E-05	0.237
_cons	-13.4137	0.129

The tmd1 coefficient was estimated as insignificant here, giving no real indication if the difference between these specific pre- and post-merger periods impacts returns differently. The other merger-specific variables too were insignificant, with the exception of isacquirer. This was somewhat unsurprising, as one would expect mergers' impact to decrease over time.

(e) Discussion

Regarding merger-related variables (isacquirer, tmd1, lindacq, lindtmd1), most important variables returned statistically insignificant coefficients, so there is little conclusive to be said about the results.

We see in both the individual periods and the combined period that acquirers exhibit abnormally high returns when compared to non-acquiring firms. This was shown with statistical significance via the isacquirer variable. While tmd1 was estimated to be positive in the overall regression (i.e. companies in post-merger periods saw stronger returns than in pre-merger periods), it also appears to be the case that the firms that merged during the years 2010-2011 were already relatively over-performing firms.

When viewed as individual periods (3 months after, 1 year after and 2 years after mergers), one sees that, with high statistical significance (0.1% level), acquirer returns are closely tied to total fixed assets. Further, the overall regression shows lind to be significant and positive. This is unsurprising; one would expect for the average company's return to be related to the industry as a whole.

Further, it is rather unsurprising that fixed assets were the strongest determinant to a firm's stock return. Colloquially, this is often talked about as the most important measure of energy companies, and this previously unsupported observation is heavily supported by the regressions analyzed in this paper. This is nearly definitively shown in both the overall regression (coefficient of 0.71 past the 0.1% level), meaning that regardless of time period, change in fixed assets tends to predict return very well. At the three month (0.93 past 0.1% level), one year (0.95 past 0.1% level) and two years (0.99 past 0.1% level) prior time periods the finding is similarly

strong. However, when comparing the z-scores, one can see that despite both being overwhelmingly significant for each period, in post-merger periods, the change in fixed assets is even more significant (z=22.21 in the overall regression compared to t=34.08/32.56/32.55 in the individual post-merger periods). This makes a bit of intuitive sense as well since the fixed asset size can be seen as a proxy for production capacity and increased capacity typically means increased profitability.

Further analyzing trends between time periods, the volatility variable's coefficient becomes more negative as the time period moves further away from the merger's completion. It also becomes more significant as a determinant of a firm's stock return. In other words, the more time that has passed since the completion of a merger, the more important a firm's short-term volatility is in determining its return.

The effect of Debt/Equity ratio on firm return was estimated to be positive, and, similarly to volatility, became a more significant factor over time. During the period in question, it is implied that, over time, firms that took advantage of debt financing tended to exhibit higher returns. In other words, the more debt companies held relative to its equity, the higher return they experienced. This goes along with the common wisdom that debt financing tends to be cheaper in an economic sense when compared to equity financing.

US energy exports were also less significant of a factor than was expected. In fact, its impact became even less statistically significant as time progressed. Despite the fact that energy exports seem intuitively like they should be crucial to a firm's return, it appears that in this period firm return was more closely dictated by company-specific factors (volatility, fixed assets).

V.
Conclusion

This paper used regression analysis in order to examine the effectiveness of mergers and acquisitions in aiding return for acquiring companies. The data was restricted to public, US acquiring companies for sake of data availability; it was restricted to acquisitions of $100mm or greater because these mergers presented significantly higher-quality (more complete and more accurate) data; in order to avoid mixing the influences of industry-specific quirks, analysis was restricted solely to the energy sector; and the analysis was completed for a number of periods between three months prior to a merger's announcement through two years post-completion of the merger.

The paper found that fixed asset total was the most important factor when identifying firms' stock return over the two years studied. Merger-related variables failed to identify value-add generated by the occurrence of a merger. However, firms that engaged in mergers tended to succeed in the long-run. This is largely explained by an inherent difference in the type of firm that enters into an acquisition rather than something attributable directly to a merger.

Perhaps useful would be extended analysis in order to determine if the decreased success of mergers during this period was tied more so to future outlook or concrete financial and operating performance of the combined entities (i.e. to what extent changes were caused more by speculation and prediction about future performance versus by concrete past performance of the company). Since it is commonly thought that debt vs equity financing each have their place for

acquisitions, further research on the topic also could include studying primarily the influence of these in order to further determine how this affects post-acquisition equity value.

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Appendix

Table: Overall regression results with GDP in place of energy exports

```
. xtreg  lfirm lind  tmd1 isacquirer volatility gdpchange lfxt lindtmd1 lindacq debt

Random-effects GLS regression                   Number of obs     =      1,086
Group variable: var1                            Number of groups  =        183

R-sq:                                           Obs per group:
     within  = 0.1806                                         min =          2
     between = 0.7961                                         avg =        5.9
     overall = 0.7533                                         max =          6

                                                Wald chi2(9)      =     722.27
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000
```

lfirm	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lind	.8853643	.3802346	2.33	0.020	.1401183	1.63061
tmd1	1.224573	1.493108	0.82	0.412	-1.701865	4.151012
isacquirer	2.842397	.5649208	5.03	0.000	1.735173	3.949622
volatility	-.0011731	.0468447	-0.03	0.980	-.0929871	.0906409
gdpchange	-3.504954	.9296651	-3.77	0.000	-5.327064	-1.682844
lfxt	.7087713	.0312751	22.66	0.000	.6474732	.7700695
lindtmd1	-.1851898	.2254877	-0.82	0.411	-.6271377	.256758
lindacq	.0003368	.0005851	0.58	0.565	-.0008099	.0014835
debt	1.08e-06	3.38e-06	0.32	0.748	-5.54e-06	7.70e-06
_cons	-6.227576	2.616613	-2.38	0.017	-11.35604	-1.09911
sigma_u	.73262789					
sigma_e	.3496923					
rho	.81444696	(fraction of variance due to u_i)				

Table: Three-month post-merger regression results with GDP in place of energy exports

```
. reg lfirm lind  tmd1 isacquirer volatility lfxt gdpchange lindacq lindtmd1 debt if threemafter1p==1
```

Source	SS	df	MS	Number of obs	=	363
				F(9, 353)	=	130.19
Model	725.0751	9	80.5639	Prob > F	=	0.0000
Residual	218.435506	353	.618797468	R-squared	=	0.7685
				Adj R-squared	=	0.7626
Total	943.510607	362	2.60638289	Root MSE	=	.78664

lfirm	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lind	2.268338	3.316775	0.68	0.494	-4.254786	8.791461
tmd1	-.0304298	4.228726	-0.01	0.994	-8.347096	8.286236
isacquirer	5.89067	3.678259	1.60	0.110	-1.343389	13.12473
volatility	.0805388	.1780254	0.45	0.651	-.2695851	.4306627
lfxt	.9313651	.0274224	33.96	0.000	.8774333	.985297
gdpchange	2.290051	5.658636	0.40	0.686	-8.838829	13.41893
lindacq	-.0025728	.0046794	-0.55	0.583	-.0117758	.0066302
lindtmd1	.0049168	.6387429	0.01	0.994	-1.251303	1.261137
debt	.0000261	.0000625	0.42	0.677	-.0000968	.0001489
_cons	-18.21128	22.09205	-0.82	0.410	-61.65988	25.23731

Table: One-year post-merger regression results with GDP in place of energy exports

```
. reg lfirm lind  tmd1 isacquirer volatility lfxt gdpchange lindacq lindtmd1 debt if oneyafter1p==1
```

Source	SS	df	MS	Number of obs	=	363
				F(9, 353)	=	124.18
Model	766.944833	9	85.2160926	Prob > F	=	0.0000
Residual	242.234104	353	.686215593	R-squared	=	0.7600
				Adj R-squared	=	0.7538
Total	1009.17894	362	2.78778712	Root MSE	=	.82838

lfirm	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lind	1.514839	2.064135	0.73	0.464	-2.54471	5.574388
tmd1	5.690253	8.338588	0.68	0.495	-10.70931	22.08981
isacquirer	5.337908	2.418052	2.21	0.028	.582308	10.09351
volatility	-.0703264	.1310478	-0.54	0.592	-.328059	.1874063
lfxt	.9474255	.0290786	32.58	0.000	.8902364	1.004615
gdpchange	-3.920256	6.37818	-0.61	0.539	-16.46427	8.623755
lindacq	-.0016766	.0029636	-0.57	0.572	-.007505	.0041519
lindtmd1	-.8393671	1.248502	-0.67	0.502	-3.294805	1.616071
debt	.0000825	.0000728	1.13	0.258	-.0000607	.0002257
_cons	-13.25867	13.84488	-0.96	0.339	-40.48749	13.97014

Table: One-year post-merger regression results with GDP in place of energy exports

```
. reg lfirm lind  tmd1 isacquirer volatility lfxt gdpchange lindacq lindtmd1 debt if twoyafter1p==1
```

Source	SS	df	MS	Number of obs	=	361
				F(9, 351)	=	122.05
Model	820.483382	9	91.1648202	Prob > F	=	0.0000
Residual	262.181556	351	.746956	R-squared	=	0.7578
				Adj R-squared	=	0.7516
Total	1082.66494	360	3.0074026	Root MSE	=	.86427

lfirm	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lind	1.169959	1.188744	0.98	0.326	-1.167998	3.507916
tmd1	-.5703462	6.490423	-0.09	0.930	-13.33536	12.19466
isacquirer	5.155561	1.544314	3.34	0.001	2.118289	8.192833
volatility	-.154672	.134838	-1.15	0.252	-.4198641	.11052
lfxt	.9918903	.030422	32.60	0.000	.932058	1.051723
gdpchange	-5.829945	5.917405	-0.99	0.325	-17.46798	5.808085
lindacq	-.0012231	.0017909	-0.68	0.495	-.0047454	.0022991
lindtmd1	.1089035	.9615526	0.11	0.910	-1.782226	2.000033
debt	.000058	.0000514	1.13	0.259	-.000043	.000159
_cons	-11.38249	8.088599	-1.41	0.160	-27.29071	4.525724

Table: Graph showing number of months between merger announcement and three months post-completion

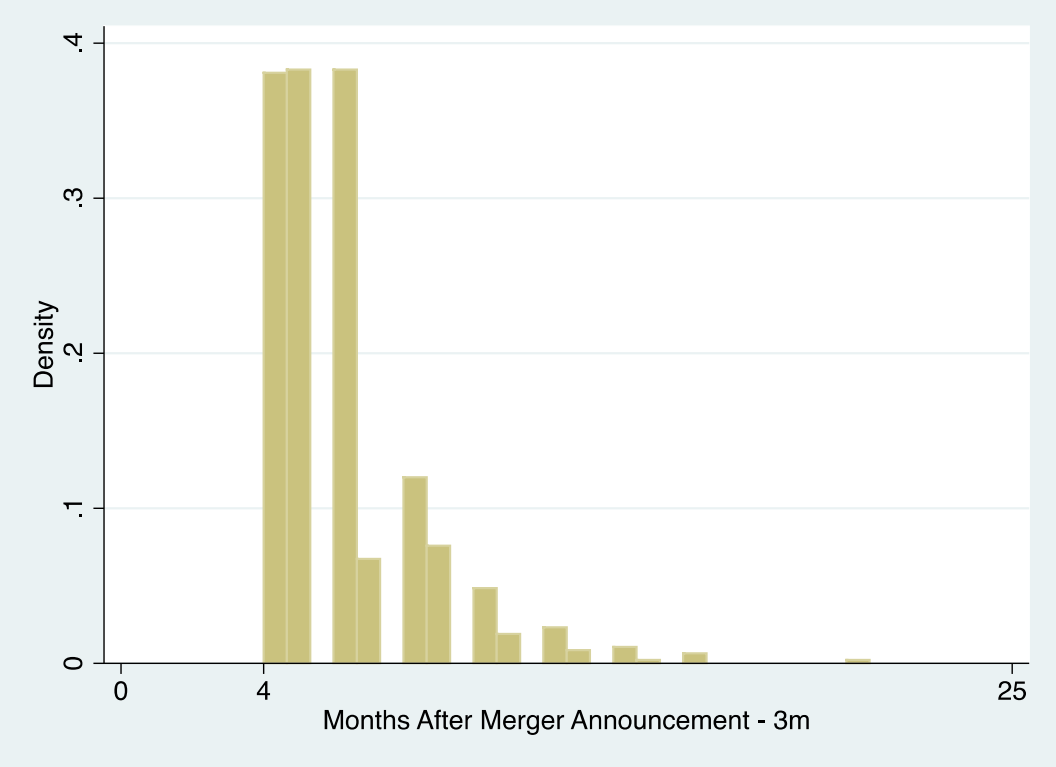


Table: Graph showing number of months between merger announcement and one year post-completion

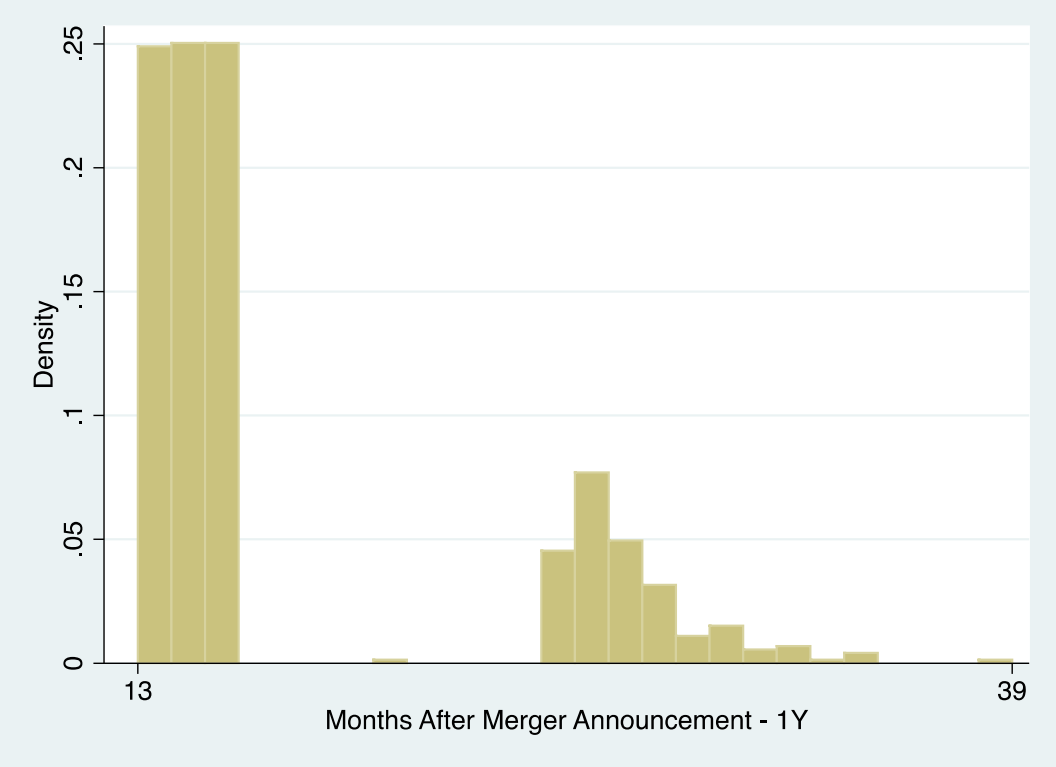


Table: Graph showing number of months between merger announcement and two years post-completion

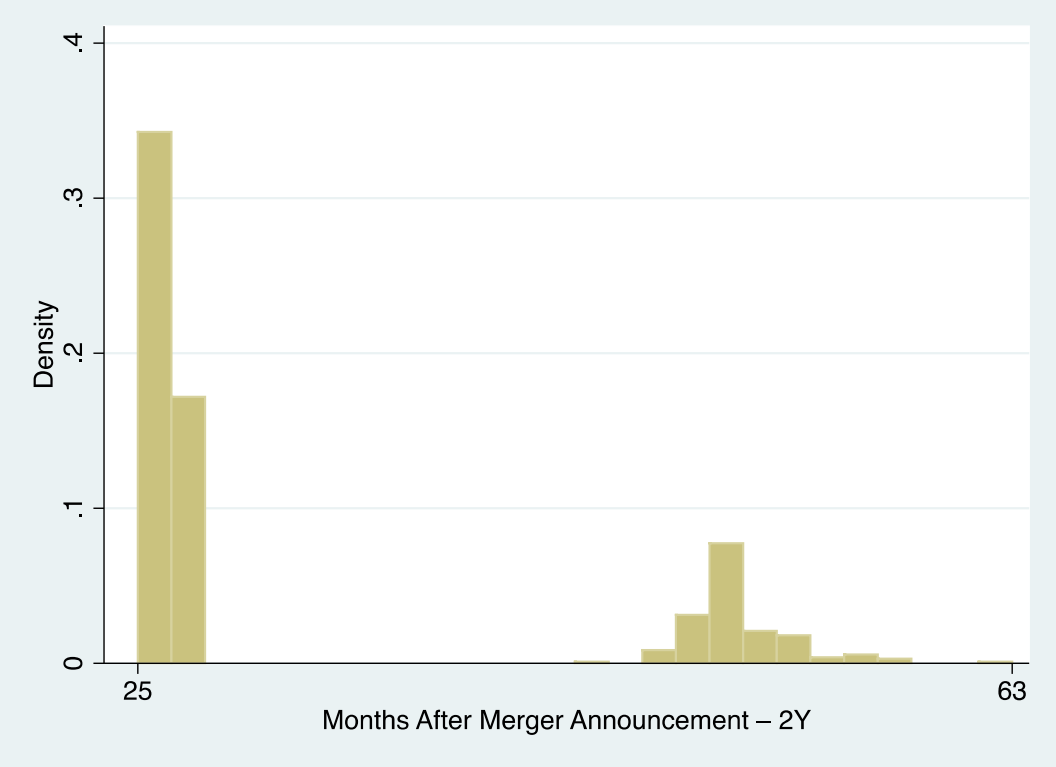
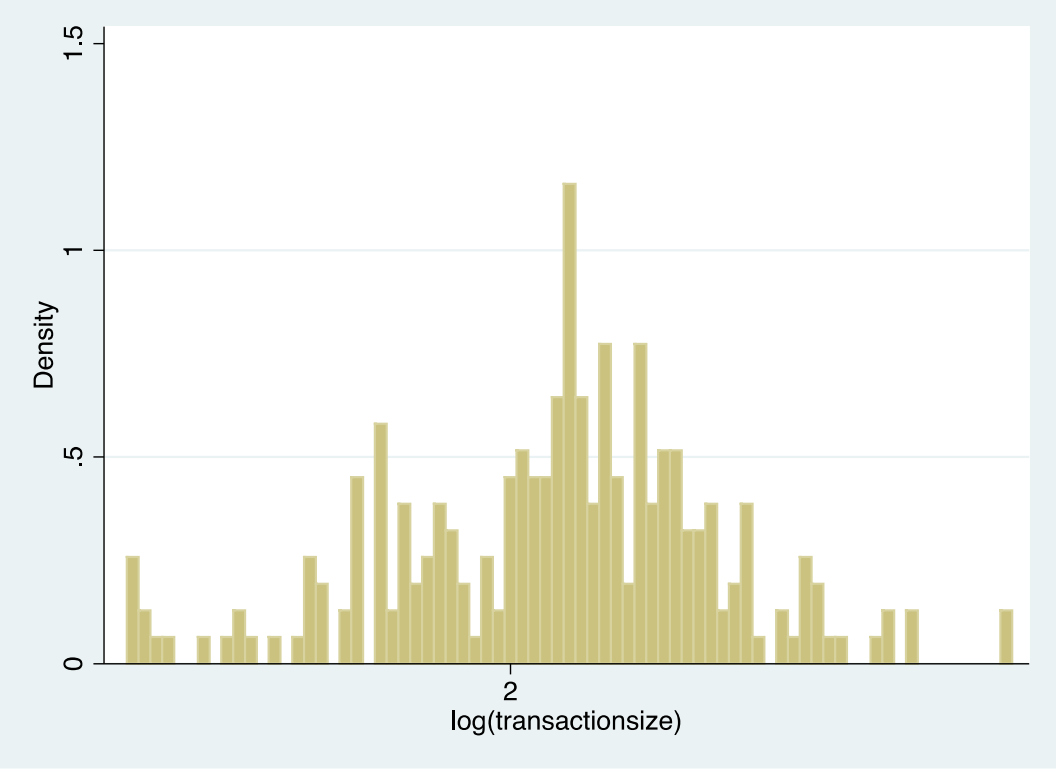


Table: Graph showing log of distribution of transaction sizes



Note:

1. Data shown is presented in $\log_{10}$(millions)
2. log(100)=2