Abandoned deals

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Abandoned deals: the merger and acquisition process in the electricity and gas industry

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ABSTRACT

High profile deals emphasize the costs of the merger and acquisition (M&A) process particularly when deals fail before closure. However, beyond anecdotal evidence, we do not know why some M&A deals in the electricity and gas industries are abandoned. We analyze a sample of over 5000 M&As in the electricity and gas industries. The three most important factors affecting M&A abandonment are if the acquirer engaged in a divestiture at the same time, whether the target firm was publicly owned, and if the acquirer already had a toe-hold (part ownership) in the target firm at the time of the M&A deal. An M&A deal is 10.17% *less* likely to be abandoned if the acquirer engaged in a divestiture at the same time. An M&A involving a publicly owned target firm is 9.87% *more* likely to be abandoned. Lastly, an M&A in which the acquirer had a toe-hold in the target company is 7.87% more likely to be abandoned. Our findings show that policy makers and practitioners should be aware that the M&A process is affected by often over-looked deal or firm specific factors.

1. Introduction

In June 2016, Energy Transfer Equity LP terminated its agreement to buy Williams Companies, Inc., a rival natural gas pipeline operator, after 18 months of negotiations. The deal was valued at nearly USD 33 billion. It fell apart after lawyers could not make a definitive conclusion about the deal's tax treatment, and Energy Transfer Equity LP opted out of its acquisition bid (Sider, 2016). Williams Companies claimed that the stalled deal would cost it between USD 4 billion to USD 10 billion in terms of lost value to shareholders (Sider, 2016). In 2005, the Spanish company, Gas Natural SDG, announced its acquisition of the Spanish electricity company, Endesa. Despite approval by the Spanish authorities, the takeover was later abandoned because Endesa opposed it (Barquin et al., 2006).

These are just two examples of mergers and acquisitions (henceforth M&As) in Europe and North America that made up the restructuring trend in energy markets[1] in the last decades. This trend has made issues of competition and industry concentration central topics in energy market research (Jamasb and Pollitt, 2005; Verde, 2008).

Structural changes in the energy industry created opportunities to obtain efficiencies through M&As that were previously infeasible or prohibited under regulation (Becker-Blease et al., 2007). Also, governmental stimulation of M&As created large national power blocks referred to as "national champions" (Verde, 2008). Furthermore, the number of diversifying M&As between gas and electricity firms has been increasing (Jamasb and Pollitt, 2005).

When competition authorities become concerned about increased market concentration and reduced competition, they intervene after the public announcement of an M&A in order to impose conditions for deal completion or to stall the deal entirely. However, the intervention of competition authorities is not the only reason that some M&As are stalled. In some cases, new information may be revealed after the public announcement of the deal that makes it less attractive than it originally seemed to be. In this case, one or both parties may voluntarily step out of the deal as in the Energy Transfer Equity LP and Williams Companies case mentioned earlier.

Even announcing an M&A deal may generate restructuring events that subsequently stall the deal. For example, BG Group from the UK, a multinational company in oil and gas, made a bid to buy Origin Energy, an Australian company active in natural gas exploration and

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production, but later withdrew its bid. This happened after Origin Energy initiated a joint venture with ConocoPhillips shortly after the bid from BG was announced. The value of Origin Energy subsequent to this joint venture was much higher than what BG Group was intending to pay (Gribben, 2008).

However, other than anecdotal evidence and individual case studies, there is little empirical evidence on the progression of the M&A process in energy markets. How many deals in energy markets are derailed before completion? What are the factors that are associated with M&As being abandoned in process and why should this be of interest to policy makers and economists? M&As are studied by researchers in diverse fields such as industrial organization, finance, accounting, management and human resources. Despite our increased understanding of M&As, an empirical puzzle that remains is the prevalence and growth in M&A activity despite high failure rates. For example, in the worldwide utilities industry alone, the value of M&A activity rose from 134 billion euros in 2008 to 329 billion euros in 2016. In the first three months of 2017 alone, the Energy and Power sector had a value of 139 billions US dollars in M&A activity, making it the largest in terms of value. This is much larger than the next closest industries, Materials, which had a value of 94 billion US dollars and Healthcare, with a value of 85 billion US dollars (Thomsons Reuters, 2017).

Despite these enormous numbers, academic research paints a somewhat dismal picture - a meta-analysis of 93 studies documents that the majority of acquisitions fail to improve firm performance in the five years following acquisition completion (King et al., 2004). Also, Kaplan and Weisbach (1992) find that 44% of acquisitions are divested within the following 7-year period. While research has focused mainly on measuring M&A performance based on short term financial performance (usually based on event studies), other work has used alternative measures such as long-term financial performance, accounting performance, employee retention, acquisition survival etc. (Zollo and Meier, 2008). Most studies focus on the post-acquisition period while there are far fewer studies on the M&A process (that is, the period when the deal is initially announced). We hope that by understanding the factors that contribute to success (or failure) in this early stage may yield insights on why some M&As succeed or fail after the M&A has moved beyond this early procedural stage. For instance, this paper finds that M&A deals involving a publicly owned target are more likely to be abandoned. If future research finds that deals that involve publicly owned targets are more likely be divested *after* the M&A deal is completed, then public ownership of target firm could be an 'early' indicator of a deal that may not eventually succeed.

These are the questions we aim to answer in this paper through an investigation based on a large sample of data. We examine a comprehensive set of factors. We examine if they are associated with an M&A deal being abandoned after it has been publicly announced using a sample of 5692 M&A transactions originating in OECD countries involving at least one firm from the energy industry in the period 1997–2012. This time window covers a substantial merger wave that was initiated in the late 1990s in the energy industries of Europe and North America, which stabilized somewhat around 2005. Until the oil price collapse that started in June 2014, the energy industry had contributed substantially to overall M&A deal value, accounting for around eleven percent of all deal value per year (Mergermarket, 2014). By focusing on OECD countries, we can examine the European Union and North American energy markets, two regions with high volumes of M&A activity that underwent substantial changes during this time frame.

In addition to finding that the most important factors associated with deal closure are whether or not the deal involved a divestiture and whether the acquirer firm had a toehold in the target (a toehold means that the acquirer already has an ownership interest in the target firm before the deal), we also find that whether or not the target is a publicly owned firm makes a difference to the M&A process. These factors, in fact, are much more influential in determining whether an M&A is completed than whether the deal was hostile or friendly or how the deal

was financed, which are frequently receive media attention and are termed 'deal-breakers'.

This paper makes two contributions. First, we contribute to the literature on restructuring in energy markets (Leggio and Lien, 2000; Newbery, 2007; Becker-Blease et al., 2007). This literature has examined important issues on the effects of legislation and the ensuing restructuring on prices and competition in energy markets (Craig and Savage, 2013; Mulder, 2015). For example, Leggio and Lien (2000) document how gains to acquirers and targets in the electricity industry vary depending on whether the merger was diversifying or not and compare the gains to non-regulated environments while Newbery (2007) discusses market design issues and differences in how mergers are treated across different European countries. Becker-Blease et al. (2007) examine these issues from the perspective of the utilities shareholder and on the basis of a number of measures, both long and short-term, find that the acquisition of utilities by other utility companies does not contribute to long-term value. More recent research (Kishimoto et al., 2017) in deregulated environments and across a range of countries, refute this finding and show that M&As improve operating performance and increase share value. These studies examine aggregate phenomena after industry-wide restructuring has occurred. Our study complements this body of literature by examining a micro phenomenon - a 'slice' of the M&A process which forms part of every M&A deal. Only deals that successfully pass this stage can contribute to overall industry phenomena that have been the focus of many studies in the energy literature. Second, we contribute to a stream of literature examining the M&A process in other industries (Wong and O'Sullivan, 2001; Muehlfeld et al., 2007; Caiazza and Pozzolo, 2014; Chakrabarti and Mitchell, 2015). Identifying factors that stall the M&A process implies that we also identify factors that can facilitate this process in energy markets.

Our findings have implications for practitioners involved in energy related M&As and can be used by them as a guide to identify key factors in the M&A process. It also serves to inform policy makers on the relative importance of factors leading to M&A abandonment. Although overall M&A abandonment rates in energy markets are similar to those found in other industries, our study finds that the specific factors affecting abandonment in the energy industry differ from industries examined so far.

M&As, both those that reach closure and those that do not, have economic and welfare implications. For example, M&As in the EU that create a so-called national champion firm are less likely to be abandoned. National champion firms capture a large part of a domestic market and are better able to compete in the international environment than other firms (Röller et al., 2007). The EC is not able to intervene in many of these M&As.[2] For example, the merger between Gaz de France and Suez suggests that European governments sometimes behave opportunistically in such deals. Similarly, any potential efficiency gains that were intended to be achieved by a merger will not be realized if a merger is abandoned in process, and in the short-term, target shareholders will not receive the positive returns that often accompany such a deal. So far, research has not examined the implications at the firm and at the industry level of the substantial percentage of M&As that do not reach closure. Our investigation in this paper seeks to contribute to an understanding of this phenomenon.

The rest of this paper is organized as follows. Section 2 provides an overview of the costs of abandonment and regulatory changes in the energy industry. In Section 3, we draw on both the economics and management literature to form expectation of the signs on the independent variables included in the model. Section 4 describes some details of the econometric model used. The data and methodology are

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[2] If over two thirds of the combined turnover of the firms engaged in the transaction is within a single country, then the country's own regulatory authority is responsible for the transaction; this is referred to as the 2/3 rule.

described in Section 5 and the results in Section 6. Section 7 provides conclusions and limitations of this study.

2. Costs to M&A abandonment and regulatory background

Why does it matter if deals are abandoned in process? First, they are costly. Not only because of direct procedural costs from advisors, banks, competition authorities, and associated termination fees but also because of "invisible" costs such as revealing private information to the other firm in the deal. Also, termination fees can amount to 3–4% of deal value (Strickland et al., 2010). For example, Daylight Resources Trust made an initial offer worth CAD 237 million to take over Cadence Energy Inc., a Calgary based oil and gas exploration company. However, it withdrew from this deal when another bidding company, Barrick Gold Corporation, made a competing offer for Cadence; Daylight Resources Trust then had to pay a CAD 9 million termination fee to Cadence (Marketwired, 2009). Second, the reputation of the firm and its managers may be negatively affected if deals fail to close. Management scholars find that abandoned deals negatively affect managerial careers in terms of compensation and reputation (Wiesenfeld et al., 2008). Third, protracted and difficult deals distract managers from other investment opportunities and from daily firm operations (Hitt et al., 1991). Of course, completed M&As also have costs associated with them and, in hindsight, some deals should have been abandoned. However, termination after announcement implies two potential 'mistakes'- not abandoning a 'bad' deal earlier or not successfully closing a 'good' deal.

Why then even attempt an M&A? Theoretical perspectives on M&As offer different reasons for M&A activity. Efficiency based reasons are based on economies of scale and scope and reducing transactions costs. Managerial reasons suggest that managers engage in M&As because larger firms offer higher compensation, and making unrelated acquisitions is a hedge against risk (Dranove et al., 2015). Besides these motivations, an important driver of M&A activity in several industries is regulatory change (Andrade et al., 2001). In the case of the electricity industry in the 1990s, a more tranquil political environment and a structural surplus of electricity reduced the need for strictly regulated markets while technological advances made it no longer necessary to have power generating facilities near end consumers (Jamasb and Pollitt, 2005). These economic, political, and technical shocks removed the need to grant monopoly rights to power generating companies and the regulation of prices since new firms were expected to enter the market (Becker-Blease et al., 2007). Although the timing of deregulation differed across countries, a substantial merger wave in the energy industries of Europe and North America started in the late 1990s. European companies experienced an increase in cash liquidity during this time that they chose to invest in M&As, which were seen as a way to prepare for liberalization and open markets (Verde, 2008; Leggio and Lien, 2000).

Shocks such as the California electricity crisis (from 2001 until roughly 2003) and the East Coast blackouts of 2003 slowed the reform plans of many US states (Sweeney, 2006). As a response to the regulatory failures in energy markets, the US congress passed the Energy Policy Act in 2005, which stimulated further M&A activity.

European energy market liberalization started in the late 1990s with the EU electricity directive of 1996 and the very similar EU gas directive of 1998. The general objective of the EU was to include European energy markets into the single European market principle and to foster competition and efficiency in the national market (Jamasb and Pollitt, 2005). However, there were some deficiencies in the directives that limited the creation of competition. To accelerate market opening, the EU issued a second directive in 2003 for both gas and electricity markets. This directive addressed a number of specific goals such as free entry to gas and electricity generation and the unbundling of transmission networks. In this way, companies could not use their ownership of the network to gain an advantage in their retail or generation businesses. These directives eased and stimulated M&A activity since many firms reshaped their business strategies according to their expectations of the future market (Verde, 2008).

3. M&A motives

There are several motives for M&A activity. The existing empirical research is inconclusive because an M&A could be associated with multiple motives and it is difficult to distinguish between them. The first is economies of scale. By consolidating resources, firms can achieve efficiencies. Idle capacity and cyclical or intermittent production can motivate firms to merge to reduce costs. Cost savings occur because resources are consolidated and because of similarities in merged processes and product lines. The second is when the acquirer would like to acquire a specific asset owned by another firm. Acquisitions are a simpler way to gain a resource, so 'buy' rather than 'make.' The third reason stems from regulatory issues. For instance, Mclaughlin and Mehran (1995) document the acquisition of an already established competitor in the utilities industry as a way increase capacity and so avoid the costs and uncertainty involved in first getting regulatory approval to build a power plant and then actually building it. Other reasons, from an economic psychology perspective, are empire building and managerial hubris. Empire building is when managers and executives are focused more on expansion through M&A rather than internal growth, R&D investments etc. while managerial hubris is when the acquiring company's managers become over-confident about their abilities relating to a target. This may make them over-pay for a target firm, or go on a 'buying spree.' They may over-estimate the value of shares and choose to pay with shares rather than cash, which is often associated with M&A failure.

Many M&As are motivated by synergy. Synergy implies that the two firms' performance improves as a result of the M&A beyond what they could accomplish independently. Synergy is difficult to measure, but the majority of research on this topic has inferred gains to shareholders as a measure of synergistic gains, usually measured after the completion of the M&A. In contrast to these, Berkovitch and Narayanan (1993) examine the correlation between target return and the total return of the combined entity and argue that positive correlation is indicative of synergy gains. However, all these studies use post M&A measurements of performance. In contrast, we ask if factors in the M&A process can be early indicators of synergy gains after the M&A. We focus on the role of divestitures. We argue that M&A deals in which the acquirer concurrently engages in a divestiture is less likely to be motivated by empire building or managerial hubris. Such deals are likely to be motivated by the need to optimize internal structure, where one part of the firm is being replaced by another that is expected to be a better fit. For this reason, they are more likely to go through.

4. Empirical model

The empirical model is a binary logit model with the dependent variable being 1 if the M&A is abandoned after announcement and 0 if completed ($M\&A\_Abandoned_i$). This model may be expressed as:

$$P(M\&A\_Abandoned_i) = 1/(1 + \exp(-z_{i+\varepsilon_i}))$$

Where z_i is a linear combination of all the independent variables included in the model and their respective coefficients which are going to be estimated for deal i. We assume that ε_i, the error term which is assumed to follow a logistic distribution. An alternative econometric specification would be to have estimated a probit model in which case the error term ε_i, would be assumed to follow a normal distribution. While the shapes of the logistic and normal distribution are different and the maximum likelihood estimates of the coefficients will also differ, predicted probabilities and marginal probabilities differ very little between the probit and logit specifications (Hill et al., 2012). Unlike linear regression models, binary logit regression models have

fewer assumptions. The dependent variable being binary, can by definition not be normally distributed. Also, homoscedasticity is no longer a concern for the binary logit model. However, such models require a sufficiently large sample size of at least 10 observations per coefficient estimated. Fortunately, this is not a constraint in the case of our data. For the sake of brevity, all independent variables, their expected sign, and the arguments are presented in Table A1 in the Appendix A. The parameters of the model are estimated by maximum-likelihood techniques using STATA 14.

5. Data and methodology

5.1. Sample description

We collected data on all M&A transactions involving gas or electricity firms announced between 1 January 1997 and 1 January 2012 in OECD countries (including countries admitted after 1997). In order to be included in our sample, at least one of the firms involved (either acquirer or target) in the M&A must be in the gas or electricity industry, so an M&A in which an electricity firm merges with an oil industry firm would be included in the sample (however, if both firms are in the oil industry, this M&A would not be in the sample). The M&A data is derived from the Zephyr database (provided by Bureau van Dijk, a private data vendor). Deals that were announced in 2012 and completed in 2013 are also included, however, initial public offerings, repurchases of own shares, or self-tender offers are excluded. After omitting data with incomplete records, we have a sample of 5692 deals.

Table A4 gives the 10 largest deals during the time period of this study. We note that these are mainly M&As within the same country. Tables A5 and A6 in the appendix list the ten countries with the highest numbers of acquiring and target firms and the accompanying completion ratios. The data confirm that the top eight countries (USA, Canada, UK, Germany, Italy, Norway, Australia and Spain) are active both as acquirers and targets. There are differences in completion rates across countries, but these differences are small. Correlation coefficients of all right-hand side variables are documented in the Appendix A (Table A7).

5.2. Statistical methods

Since the 5692 announced M&As were conducted by a total of 2850 firms, we use standard errors clustered by acquirer to control for within-firm correlation. In total, we estimate seven models as shown in Tables A2 and A3. The first model is a benchmark model and includes all independent variables. Models 2, 3, and 4 are restricted to subsamples in which the target firm is from the EU, North America, or the "rest of the world" (RoW). Models 5 through 7 are restricted to subsamples based on the industry classification of the target firm (electricity, gas, and other). Separate regressions are shown in Models 2 through 7 for two reasons. First of all because of inconclusive evidence about the extent that these markets are integrated and compete with each other (Asche et al., 2006; Serletis and Herbert, 1999). Second, results of testing an ordinal generalized linear model (Williams, 2010) show that there are considerable differences between coefficients across different regions and different industries. We also examined the data for multicollinearity and outliers, which was not of concern.[3]

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[3] The correlation coefficient between the acquired stake variable and the toehold dummy variable is 0.86, suggesting that firms seek to expand their ownership interest in a firm in which they have an existing interest. Although this correlation coefficient is high, we find no evidence that standard errors are inflated for these variables (both are statistically significant), which is a common problem when multicollinearity is an issue. The outliers were five observations of acquisitions initiated by Dutch firms for which the target and acquirer are the same, and the acquired stake is zero. It appears that these transactions had only legal or accounting purposes and are, therefore, excluded from the empirical analysis.

6. Results

6.1. General findings and estimation issues

The coefficients of the variables are displayed in log-odds in Tables A2 and A3 in the Appendix A. The log-odds are $\log\left(\frac{p}{(1-p)}\right)$ where p is the probability that an announced M&A is abandoned. A log-odds coefficient that has a negative sign implies that increasing this variable reduces the chance of abandonment. Similarly, a positive sign implies that increasing this variable increases the chance of abandonment. Unlike in the case of linear regression, the effect of a change in an independent variable on the dependent variable is not constant in the case of a logit model and depends on the values of the other independent variables. Therefore, we interpret the model by describing average marginal effects[4] for variables that have the greatest impact on abandonment likelihood.

6.2. Effects of independent variables on deal abandonment

We first describe the effects of the three most important determinants of deal abandonment in terms their magnitude. The marginal effects of the coefficients relating to these three variables are among the highest in comparison to the other independent variables. First, deals that involve a divestiture are much less likely to be abandoned. In the benchmark model, the likelihood of abandonment is, on average, 10.17% lower for deals involving divestitures. The larger role of divestitures within Europe in comparison to the US can be observed in the larger marginal effect of divestiture on the abandonment likelihood for the European market.

Second, we find that the *public target* variable is positive and significant for all subsamples except for Model 6 (gas industry). For example, in the overall sample, an M&A in which the target is publicly listed is, on average, 9.82% more likely to be abandoned compared to an M&A with a privately held target. These probabilities are largest for deals from North America. The M&A process may be more complex when taking over a publicly owned target firm as, for instance, there are more disclosure requirements than in the case of private firms. The public status of the acquirer, in contrast with that of the target, does not seem to have an effect on whether or not the M&A is completed.

Third, we find that toeholds have a positive and significant effect on the likelihood of abandonment. In the finance literature, a toe-hold is a strategy in which the acquirer acquires a small stake in the target firm prior to the M&A. This is intended to show the acquirer's commitment to the target. It also provides some compensation for the initial costs of the deal for the acquirer. If another bidder acquires the target firm, at least the acquirer can collect the profit on the toehold. However, research has shown that this may have the opposite effect. That is, the toe-hold is seen as a strong-arm tactic by the target management who then react in a defensive manner which then derails the deal.

Our empirical evidence finds that toe-holds make M&A abandonment more likely. We find that the effect of the toe-hold is also economically significant as transactions in which the acquirer has a toe-hold are 7.87% more likely to be abandoned. Therefore, we find empirical evidence supporting the second argument, which is that toe-holds foster target hostility which then results in a deal being abandoned. We do not find evidence for the first argument which suggests that toe-holds show commitment from the acquirer in the target and are supposed to ease the M&A process.

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[4] Average marginal effects are calculated by changing the independent variable (x) of interest by one unit (x + 1) with other independent variables fixed at their observed values in the sample. The difference in the predicted probability for each observation is calculated (between x and x + 1), and this difference is averaged over all observations in the estimation sample. In the event that x is categorical, this is the change in probability of abandonment when x changes from 0 to 1 (with other independent variables fixed at their observed values).

Regarding other independent variables, we find that the *acquired stake* (the stake in the target firm that the acquirer firm gains) has a positive effect in the benchmark model (p < 0.05) but is not significant for all subsamples. Furthermore, the effect size is not substantial. For example, in the overall sample, a 100% takeover is only around 3.32% more likely to be abandoned compared to a deal in which the degree of control sought is 30%. Of course, an increase in stake from 49% to 51% might have a much larger impact than an increase from 72% to 74%. However, further inspection of the marginal effects in this case does not indicate this. The effect of the size of the deal, *deal value*, on abandonment, though positive and statistically significant, is practically negligible. A 600-million-dollar deal compared to a 400-million-dollar deal is only 0.19% more likely to be abandoned.

For experience with successful M&As, we expected a negative effect on abandonment with diminishing returns. We find results consistent with this prediction (p < 0.01) in the benchmark model and Model 2 (EU). One additional completed deal in the past history of the firm makes the firm 0.8% more likely to complete the focal deal. In the North American sample, both success experience terms are insignificant. Our predictions regarding *failure experience* are confirmed (p < 0.01) with the expected signs except for the quadratic term of failure experience for Models 3 (North America) and 4 (RoW). For the North American sample, this might be explained by insufficient data on firms with higher levels of experience. Overall, one additional abandoned deal in the firm's past history makes the firm 3.58 less likely to complete the focal deal.

In the electricity industry, the coefficients for *failure* and *success experience* as well as the squared terms are significant with the expected signs (p < 0.01). In contrast, none of the experience coefficients are significant for M&As by gas industry firms. Overall, the effect of failure experience on M&A abandonment is about four times larger than the effect of success experience, suggesting that lessons from past deal abandonments have a more pronounced impact on future deal closure.[5]

In terms of the impact of features relating to the industry and external environment on deal abandonment, find no evidence that abandonment is influenced by whether or not an M&A is horizontal. For larger transactions in which scrutiny by competition authorities is more likely, coefficients still remain insignificant. This is despite the fact that the ratio of horizontal transactions, as a percentage of total M&As, is higher for larger deals. Therefore, even for larger deals for which we would expect greater scrutiny from competition authorities, we do not find evidence that horizontal or converging deals are more likely to be abandoned. One may have expected higher abandonment rates for vertical M&As because unbundling of production stages was an objective during this period of market liberalization.[6] However, the effect size

for vertical M&As, though statistically significant for some sub-samples, is modest in magnitude. Using the benchmark model, a vertical M&A is 3.32% more likely to be abandoned in comparison to an unrelated M&A. Vertical M&As in the EU are more likely to be abandoned than in North America. Newbery (2007) points out that, in North America, the M&A assessment approach is strict, but companies are free to exploit market power while, in the EU, M&A assessment is more relaxed, but the exploitation of market power is prevented by rules and regulations.

The coefficients for converging M&As are all insignificant except for the model in which the targeted firms are from the EU where the majority of convergence M&As was between gas and electricity firms. The argument for synergies for these M&As appears to be more straightforward and is twofold: in upstream linkages where advances in technologies allowed a more extensive use of natural gas as a source for generating electric power and in downstream linkages because companies can bundle their gas and electricity services (Verde, 2008). In an analysis not reported here, we distinguished between electricity-gas converging M&As and converging M&As in which an oil firm is involved. This yields a positive coefficient for the gas-electricity convergence M&As (p < 0.1) and an insignificant coefficient for converging M&As involving an oil firm. This demonstrates that M&As between gas and electricity firms are more likely to stall while the opposite holds for M&As between oil industry firms and either electricity or gas industry firms.

We find that the degree of independence of the competition authority has an effect on abandonment only in the case when the target firm is situated in North America. In all other cases, this coefficient is insignificant suggesting that this variable does not have much explanatory power in the presence of the other variables included. Note that the independence of the competition authority variable is time-invariant and captures country level variations as well.

While we do not report these variables in the tables, our analysis includes other variables commonly associated with the M&A process. Notable findings among these are that, while deals that are predominantly paid in cash facilitate the M&A deal, it is significant only for the electricity and 'other' industry subsample. These findings are in contrast with those from other industries. A possible explanation is the large average deal value in the energy industry (591 million dollars in our sample), which is larger than most transactions in other industries (Schwieters et al., 2014). Larger deals are more likely to be paid in stock rather than cash. As expected, friendly deals are less likely to be abandoned. This effect holds for all sub-samples except the EU, Gas, and Other subsamples (for which acquisition attitude was not reported for many deals). However, the marginal effect is not substantive. A friendly transaction is only 3.66% less likely to be abandoned than one that is not. We do not find any evidence that cross border deals are more likely to be abandoned compared to domestic ones. Quite interestingly, the coefficient is not significant for the EU sample, implying that domestic mergers are neither more nor less likely to be abandoned than cross-border ones. This also has implications for the policy debate about national champion deals that relates to the protection of firms of national importance by fostering domestic rather than cross-border deals (Becker-Blease et al., 2007; Suedekum, 2008). We also find that, even in the case of very high value deals which could be indicative of national champion deals, such deals are not less likely to be abandoned than cross-border ones. So, the general perception that national champion deals are pushed through by lobbying efforts, etc. may hold only for a few high-profile deals. However, for the majority of deals (also large ones), the distinction between domestic and cross-border is not so relevant where deal abandonment is concerned. Lastly, the period dummies for *2001–2003* and *after 2003* indicate significantly higher abandonment rates in most cases.

7. Conclusion

The volume of M&A activity in the energy sector increased rapidly from 1997 until 2005 after which it somewhat stabilized. This increase

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[5] We conducted some robustness tests on the experience variables. First, we address the issue of the measurement of experience in terms of the time period. The experience variables are calculated within the sample window; hence M&A experience accumulated prior to this is not accounted for. To assess this assumption, we estimate an alternative model in which we examine the abandonment of deals between 2000 and 2012 and compute the experience variables using the time period 1997–2000. Our results are unchanged. Second, to test whether distinguishing between success and failure experience is meaningful, the same models have been computed with an overall M&A experience (adding success and failure). However, this overall M&A experience variable is insignificant in all models suggesting that the distinction is informative. Last, we explore if the effect of M&A experience is achieved not only through M&A experience but also through a more general measure of experience measured by firm age. However, we excluded firm age after finding that it was insignificant when included, and its inclusion did not affect the coefficients of the M&A experience variables.

[6] In robustness tests, we used data from Eurostat (for a sample of EU countries) to include the number of retailers active in the electricity and gas market as an approximate measure of the competitiveness of the retail aspect of the market. However, this variable was insignificant as a substantial amount of restructuring involves non-retail firms.

in M&A activity was stimulated by policies that were intended to make energy markets more liberalized and integrated. While the determinants and consequences of M&As have been researched in the general M&A literature, we do not know why some of the M&As in the energy industry are announced and later abandoned. This study has tried to address this gap and empirically tests the determinants of the likelihood of abandonment of announced M&As in the energy industry. To inform both policy makers and practitioners, we examine the role of a comprehensive set of factors in determining why M&As are abandoned.

In terms of our independent variables, the variables which have the largest impacts are if the acquirer engaged in a divestiture at the same time as the M&A, whether the target was publicly owned and if the acquirer already had a toe-hold in the target firm. Firstly, we find that divestiture at the time of the M&A decreases the likelihood of abandonment by 10.17%. A deal in which the target is publicly increases the likelihood of abandonment by 9.87%. Thirdly, having a toehold in the target makes a deal 7.87% more likely to be abandoned.

We interpret the importance of divestitures in facilitating deal completion in the energy industry also as evidence of the prevalence of industry-wide restructuring. Much of the legislation in gas and electricity markets resulting in privatization and unbundling has been introduced with the aim to foster competition. In addition, the break-up of nationally owned, vertically integrated energy companies has resulted in substantial restructuring.

In some cases, energy M&As may be more likely to be scrutinized by competition authorities during the deal process if their restructuring efforts seem to 'undo' the aims of legislative changes; such M&As may be stalled if a divestiture does not take place. In other cases, divestitures are likely to have been initiated due to the firms' attempting to optimize internal structure or to free up cash reserves to make the focal deal possible. The importance of divestitures in facilitating deals in energy markets also allows us to infer that some of the motives attributed to M&As in general are less likely to be applicable to energy M&As. For instance, motives such as the acquisition of patents and financial diversification are less likely to be relevant to energy deals.

Our findings diverge from studies on the M&A process based on other industries. For instance, for the chemical manufacturing industry, Chakrabarti and Mitchell (2015) do not find divestitures to be important before the merger is completed. They explain their findings by pointing out that this is most likely because concentration in this industry has been low and declining. Similarly, Muehlfeld et al. (2012), in their study of the declining newspaper industry, find ownership status of the target firm and the type of financing to be the most influential factors in deal completion. In both of these industries, divestitures as an aspect of deal related restructuring are not found to be important in achieving deal completion. This shows that the factors derailing (or facilitating) deal processes differ across industries.

We find that the acquirer having a toehold in the target results in a deal being more likely to be abandoned. Toeholds are a measure of a past relationship between acquirer and target and could be the means for acquirers to improve their bargaining position and deter competing bidders. However, they are also known to foster opposition from the target firm. In the case of energy firms, it appears that this second factor seems to dominate, and any improvements in the bargaining position of the acquirer do not translate into successful closure. This finding also points to the importance of the perception of the target to strategic moves by the acquirer. Toeholds are viewed by the acquirer as a way to overcome risk, but our findings show that they are, in fact, likely to derail the process for energy firms.

Our findings have implications for policy makers and practitioners involved in the M&A processes of energy firms. While restructuring and divestitures may be part of a larger strategic plan, our findings about the role of divestitures and toeholds imply that issues specific to a particular deal may stall a process. Toeholds, despite being frequently used as a strategy, do not seem to help in deals in energy markets. Practitioners interested in knowing why some deals stall should also pay attention to deal specific factors. Insights from the other variables included in the model may also yield insights. The apparent lack of 'learning' suggests that while large consulting firms such as PricewaterhouseCoopers and EY may promise a smooth M&A process, their impact on the actual completion of the process is small. Policy makers should note that rather than industry or country specific factors, factors specific to the deal may be most important. This suggests that interventions at the national level have only limited effects on a particular deal.

Our study is not without limitations. By employing a large-scale dataset on M&As, we have been able to identify the major factors that facilitate M&A deal making in gas and electricity markets. While an extensive number of deals are covered, what is missing in our data is information on the motivations for the restructuring and information on the nature of any intervention by competition authorities. Such information would increase our understanding of this process. Also, restructuring involves both M&As and divestitures. Therefore, it is likely that there is a third factor that is related to M&A abandonment and our independent variables. For example, we could theorize on a demand shock or a supply shock that results in restructuring efforts by the firm which involve both a divestiture and an acquisition. Therefore, we cannot infer causal linkages but can only describe associations. To detect causal links would involve finding settings such as natural experiments for example due to changes in regulations. Future research could explore the value of this information in understanding this stage of the M&A process in energy markets.

Acknowledgements

Appendix A

See Tables A1–A7

Table A1
Overview of independent variables affecting M&A abandonment and predicted signs.

Variable	Predicted sign	Argument
Independent Variables		
Divestitures	−	Divestitures are likely to be motivated by goal to optimize internal structure. In some cases, it may be required by competition authorities. Dummy is 1 if deal involves divestiture of existing assets.
Toehold	±	Toeholds reflect a commitment from the acquirer in the target firm making the deal less likely to be abandoned but could also foster target management resistance making the deal more likely to be abandoned. Dummy is 1 if acquirer already owns percentage of shares in target.
Acquired Stake	±	Higher degree of control indicates acquirer values the target as important. However, it also represents a greater loss in control for the target which may lead to target resistance. Percentage of (common) shares in target sought by acquirer.
Deal value	±	Deals of larger size are organized more carefully. However, management of larger firms may be more adept in defense mechanisms. Measured in tens of millions of Euros.
Public target	±	Publicly owned firms face disclosure requirements that private firms do not face. However, the pricing of public firms is more straightforward which makes the M&A process smoother for public targets. Dummy is 1 if target is publicly owned.
Public acquirer	+	Similar to public target firms, disclosure requirements may slow down the M&A process for public acquirers. They are more likely to be under the scrutiny of competition authorities. Dummy is 1 if acquirer is publicly owned.
Success experience	−	Firms that have completed many M&As may have better routines and an M&A processing infrastructure in place. Measured by number of deals successfully completed before focal deal.
Success experience^2	+	Captures diminishing returns to success experience.
Failure experience	+	Firms that abandoned many M&As may have the wrong routines in place. Measured by number of deals abandoned before focal deal.
Failure experience^2	−	Captures diminishing returns to failure experience. Firms with high levels of failure experience might eventually identify flawed routines and correct them.
Horizontal	±	Higher levels of relatedness are associated with better post M&A performance. However, such M&As may face more scrutiny from competition authorities. Dummy is 1 if firms in same sub-industry (NACE, code 4th digit).
Vertical	±	These deals benefit from synergy opportunities, yet legislation aimed to unbundle the energy production chain may stall such M&As. Dummy is 1 if same industry (NACE, code 3rd digit) but different sub-industry (NACE, code 4th digit).
Convergence	±	Same issues as the above two variables. Dummy is 1 if deal is between firms from different energy industries.
Independence competition authority	+	The greater the independence of the competition authority of the country of the acquirer/target, the more likely the deal is to be stalled. Composite measure based on Høj (2007).

Table A2
Independent variables determining deal abandonment by geographical region.

Variable name	(1) Overall sample	(2) Target EU	(3) Target N-America	(4) Target RoW
Independent variables				
Divestiture	− 2.172***	− 1.609***	− 3.287***	− 3.734***
	(0.352)	(0.408)	(1.022)	(1.230)
Toehold	0.763***	0.525*	0.968	1.586***
	(0.232)	(0.301)	(0.631)	(0.429)
Acquired Stake	0.007*	0.006	− 0.001	0.011
	(0.003)	(0.004	(0.010)	(0.007)
Deal Value	0.009**	0.007**	0.016***	0.020
	(0.004)	(0.004)	(0.006)	(0.028)
Public target	0.899***	0.892***	13.984***	0.842**
	(0.139)	(0.162)	(1.023)	(0.353)
Public acquirer	0.137	0.156	1.560*	− 0.218
	(0.132)	(0.145)	(0.901)	(0.390)
Success experience	− 0.093***	− 0.095***	− 0.044	− 0.098
	(0.024)	(0.030)	(0.057)	(0.090)
Success experience^2	0.003***	0.003***	− 0.003	0.008
	(0.001)	(0.001)	(0.004)	(0.007)
Failure experience	0.412***	0.351***	0.729***	0.016
	(0.088)	(0.105)	(0.270)	(0.376)
Failure experience^2	− 0.033***	− 0.029***	− 0.070	0.040
	(0.008)	(0.009)	(0.055)	(0.123)
Horizontal	0.051	0.098	− 0.096	0.050
	(0.108)	(0.144)	(0.257)	(0.291)
Vertical	0.367***	0.356**	0.323	0.719***
	(0.116)	(0.166)	(0.276)	(0.276)
Convergence	0.180	0.346*	0.006	− 0.451
	(0.156)	(0.191)	(0.362)	(0.510)
Independence competition authority acquirer	− 0.115	− 0.263*	0.362**	0.192
	(0.120)	(0.149)	(0.184)	(0.305)

Table A2 (*continued*)

Variable name	(1) Overall sample	(2) Target EU	(3) Target N-America	(4) Target RoW
Independence competition authority target in cross border deals	0.082 (0.092)	0.112 (0.125)	1.352 (1.856)	− 0.181 (0.171)
Target in EU	− 0.117 (0.148)			
Constant	− 3.054*** (0.468)	− 3.305*** (0.599)	− 17.099*** (2.283)	− 4.283*** (1.134)
Observations	5692	2652	2273	767
Pseudo R-squared	0.130	0.115	0.165	0.182
Log pseudolikelihood	− 1723	− 953.5	− 461.6	− 253.4

Robust standard errors in parentheses.
*** p < 0.01.
** p < 0.05.
* p < 0.1.

Table A3
Independent variables determining deal abandonment by industry.

Variable name	(1) Overall sample	(5) Electricity Ind.	(6) Gas industry	(7) Other
Independent variables				
Divestiture	− 2.172*** (0.352)	− 2.643*** (0.542)	− 1.835*** (0.610)	− 1.413** (0.563)
Toehold	0.763*** (0.232)	0.525* (0.301)	0.968 (0.631)	1.586*** (0.429)
Acquired Stake	0.007** (0.003)	0.007 (0.005)	0.011 (0.008)	0.003 (0.007)
Deal value	0.009** (0.004)	0.014*** (0.004)	0.024** (0.010)	0.003 (0.005)
Public target	0.899*** (0.139)	1.052*** (0.174)	0.374 (0.324)	0.813** (0.335)
Public acquirer	0.137 (0.132)	0.098 (0.174)	0.383 (0.341)	0.040 (0.297)
Success experience	− 0.093*** (0.024)	− 0.082** (0.034)	− 0.074 (0.054)	− 0.059 (0.054)
Success experience^2	0.003*** (0.001)	0.003** (0.001)	0.003* (0.002)	− 0.001 (0.002)
Failure experience	0.412*** (0.088)	0.355*** (0.134)	0.092 (0.209)	0.261 (0.261)
Failure experience^2	− 0.033*** (0.008)	− 0.035** (0.014)	0.012 (0.033)	0.040 (0.052)
Horizontal	0.051 (0.108)	0.124 (0.166)	0.039 (0.256)	
Vertical	0.367*** (0.116)	0.501*** (0.179)	− 0.008 (0.271)	
Convergence	0.180 (0.156)	0.297 (0.274)	− 0.031 (0.275)	
Independence competition authority acquirer	− 0.115 (0.120)	− 0.154 (0.145)	0.037 (0.300)	− 0.206 (0.207)
Independence competition authority target in cross border deals	0.082 (0.092)	− 0.031 (0.144)	0.276 (0.187)	− 0.190 (0.173)
Constant	− 3.054*** (0.468)	− 2.889*** (0.604)	− 4.632*** (1.151)	− 2.027** (0.982)
Observations	5692	2569	1618	1419
Pseudo R-squared	0.130	0.153	0.142	0.129
Log pseudolikelihood	− 1723	− 870.5	− 432.7	− 355.9

Robust standard errors in parentheses.
*** p < 0.01.
** p < 0.05.
* p < 0.1.

Table A4
10 largest completed deals.

N	Acquiring company and country		Target company and country		Deal value[*]	Year completed
1	KONINKLIJKE NEDERLANDSCHE PETROLEUM MAATSCHAPPIJ NV	NL	SHELL TRANSPORT & TRADING CO PLC	NL	72,307.61	2005
2	GAZ DE FRANCE SA	FR	SUEZ SA	FR	45,547.09	2008
3	ENEL ENERGY EUROPE SRL	IT	ENDESA SA	ES	32,155.00	2007
4	ELECTRABEL SA	BE	SUEZ-TRACTEBEL SA	BE	21,000.00	2007
5	DUKE ENERGY CORPORATION	US	PROGRESS ENERGY INC.	US	19.965.09	2012
6	IBERDROLA SA	ES	SCOTTISH POWER PLC	GB	17.233.23	2007
7	E.ON AG	DE	POWERGEN PLC	GB	14.844.39	2002
8	VEBA AG	DE	VIAG AG	DE	13.900.00	2000
9	LAKE ACQUISITIONS LTD	GB	BRITISH ENERGY GROUP PLC	GB	13.852.53	2009
10	FIRSTENERGY CORPORATION	US	GPU INC.	US	13.629.84	2001
11	SCOTTISH POWER PLC	GB	PACIFICORP INC.	US	12.002.85	1999
12	E.ON AG	DE	ELECTRA DE VIESGO SA	ES	11.800.00	2008

[*] In million Euros.

Table A5
Top 10 acquiring countries.

Country	Number of transactions	Percentage of total	Percentage completed
United States	1993	25.08%	93.23%
Canada	885	11.14%	91.07%
Germany	606	7.63%	83.99%
United Kingdom	554	6.97%	91.16%
Italy	483	6.08%	84.06%
Spain	356	4.48%	86.24%
Norway	348	4.38%	87.36%
Australia	289	3.64%	87.54%
France	250	3.15%	85.20%
Sweden	229	2.88%	87.77%
Total of sample	**7.946**	*100%*	**87.96%**

Table A6
Top 10 Target countries.

Country	Number of transactions	Percentage of total	Percentage completed
United States	2199	25.11%	89.54%
Canada	978	11.17%	88.24%
United Kingdom	666	7.60%	83.78%
Germany	613	7.00%	82.87%
Italy	591	6.75%	81.05%
Spain	394	4.50%	76.90%
Norway	391	4.46%	81.59%
Australia	354	4.04%	79.38%
Netherlands	229	2.61%	82.10%
Sweden	219	2.50%	84.02%
Total of sample	**7946**	*100%*	**87.96%**

Table A7
Summary statistics and correlations.

	Mean	S.D.	Abandoned	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Abandoned	0.17	0.37															
Cash (1)	0.53	0.50	− 0.01														
Degree of control sought (2)	88.43	25.75	0.03*	− 0.21***													
Friendly (3)	0.19	0.39	0.15***	− 0.11***	0.13***												
Deal value (4)	590801	3.33e + 06	− 0.18***	− 0.03**	0.04**	0.11***											
Toehold dummy (5)	0.14	0.35	− 0.06***	0.17***	− 0.86***	− 0.07***	− 0.02										
Cross border (6)	0.23	0.42	0.0	0.05***	− 0.01	0.04**	0.08***	0.01									
Public target (7)	0.36	0.48	− 0.20***	0.09***	− 0.16***	0.1***	0.11***	0.14***	− 0.02								
Public acquirer (8)	0.54	0.50	− 0.07***	− 0.07***	− 0.10***	0.11**	0.10***	0.09***	0.05***	0.32***							
Target is subsidiary (9)	0.33	0.47	0.11***	0.06***	− 0.19***	− 0.04	0.11***	0.19***	− 0.08***	0.27***	0.05***						
Success experience (10)	3.01	5.44	0.05***	0.05*	− 0.13***	− 0.01	0.19***	0.13***	− 0.13***	0.08***	0.27***	0.06***					
Failure experience (11)	0.42	1.26	0.14***	0.08***	− 0.16***	− 0.02	0.30***	0.16***	0.17***	0.16***	0.23***	0.10***	0.61***				
Divestiture (12)	0.22	0.41	− 0.26***	− 0.01	− 0.21***	− 0.25***	− 0.04	0.10***	− 0.05**	− 0.21***	− 0.13***	− 0.1***	− 0.03	− 0.05**			
Horizontal (13)	0.26	0.44	0.02*	0.02	0.01	0.04	0.06***	− 0.01	0.01	0.03	− 0.05***	− 0.02**	0.05***	0.09***	0.03		
Vertical (14)	0.2	0.4	0.01	0.03	0.03*	0.04*	− 0.02	− 0.01	− 0.04***	0.0	0.05***	− 0.03***	0.03*	0.01	− 0.09***	0.02**	
Convergence (15)	0.08	0.27	0.03**	− 0.01	− 0.03***	0.04	0.04**	0.05***	− 0.03***	0.07***	0.10***	0.01	0.06***	0.08***	− 0.02	− 0.17***	− 0.14***
Independence competition authority acquirer (16)	1.31	0.89	− 0.03**	− 0.12***	0.05***	0.09***	0.00	− 0.04***	0.04***	− 0.1***	− 0.08***	− 0.05***	− 0.07***	− 0.08***	0.04	0.02**	0.05***

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