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Consolidation and Market Power of Energy Utilities –

The case of US-American and German Utility Takeovers

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Abstract

Between 1990 and 2002 a wave of takeovers was observed in the North American and European energy utilities market. We analyze the impact of these takeovers on market power, studying 70 takeovers of US-American and 69 takeovers of German energy utilities by applying event study methodology. Stock price reactions of acquiring and target firms as well as of their competitors are used as an indicator for market power. While we do not find any significant results pointing in this direction for transactions in the US, our findings clearly indicate that the potential to increase market power is indeed an important motive for takeovers within the German energy utilities market.

Keywords: acquisitions, energy utilities, market power, oligopoly, regulation,

JEL Classification: L40, L94, L95, G14, G34

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1. Introduction

In the 1990s, the takeover market experienced a boom of unprecedented proportions. In 1999 alone, the worldwide takeover volume was estimated to be 2.3 billion US\$. By comparison in 1985, it was only 165 million US\$, in 1992 286 million US\$.² Energy utilities were among the most active players in this latest “wave of takeovers”. Pryor (2001) estimates that utilities accounted for 6.3% of worldwide takeovers in 1999, the fifth most active industry after manufacturing industries, telecommunications, banking and insurance services and service companies.

The popularity of takeover strategies among energy utilities has been traced back to the extensive deregulation of many national energy supply markets: previously energy supply was seen as a natural monopoly in need of comprehensive regulation. From the beginning of the 1980s onwards, opinions shifted in America and later in Europe. Today, only certain sectors of energy supply are still viewed as natural monopolies.³ Legislators in many countries began to introduce elements of market competition. The Directive 96/92/EC and Directive 98/30/EC set common rules for the internal electricity and gas markets and they provided the foundation for the liberalization of energy supply in the individual European Union member states. In the United States the structure of power markets changed significantly in the 1990s. Before, it was one of the most tightly regulated industries in the United States. With the passing of the Energy Policy Act in 1992, the electricity wholesale markets were widely deregulated..⁴

Despite the high empirical relevance of takeover strategies for energy utilities and suppliers, surprisingly little well-founded analysis is actually available about the motives. The existing studies either analyze other industries or maintain a general perspective without focusing on specific industries. The particular nature of energy supply, i.e. the aforementioned regulation and the resulting market structure, suggests that a focused consideration of takeover strategies for energy suppliers would be relevant.

Takeovers among energy utilities are usually justified by the management as a means of effecting increased efficiency, for example through operative synergetic effects resulting from economies of scale and scope. Management synergies are a further possible motivation, where the superior management skills of the buying firm can be applied to the takeover target.⁵ A

² cf. Pryor (2001), p 828.

³ cf. Drasdo et al. (1998), p 31 ff.; Isser (2004), S. 219ff; Kiesling (2004), p 53.

⁴ cf. Energy Information Administration (2003b), Energy Information Administration (2003a).

⁵ cf. Jensen (1993).

number of studies of energy utilities in the US contain indications that the efficiency of energy utilities could indeed be increased as a result of takeovers.⁶

Another explanation suggests that mergers between energy utilities are undertaken with the intention of increasing market power and making collusive behavior easier with a view to increasing energy prices at the cost of consumers.⁷ This seems a plausible motive for energy utilities as most national energy markets are dominated by a few main suppliers. In Germany, for instance, the three largest electricity producers supply approx. 60% of the entire market. In France, Ireland and Greece data suggest more than 85 per cent.⁸ At present, no empirical investigations are available that directly consider the attainment of market power through mergers and takeovers among energy utilities.

This paper analyzes the takeover and merger behavior of energy utilities between 1990 and 2002 in the largest American market, the USA, and the largest European market, Germany. As an indicator of increased market power, stock prices of the acquiring and target firms as well as those of their industry competitors at the time of takeover announcement are measured and evaluated.

Remaining sections of this paper are structured as follows. The section two examines available cross-industry literature and develops hypotheses about the relationship between stock price reactions to takeovers and market power. Section 3 explains the data sample and methodology used. Section 4 details the results independently for takeovers and mergers in the US and German energy utility markets. The final section summarizes the results and discusses conclusions.

2. Market Power as a Motive for Utility Takeovers

Horizontal mergers are a central aspect when considering the relationship between takeovers and increased market power.⁹ The argumentation is as follows: The incentive for different businesses to adjust their production levels to match one another depends upon the monitoring costs of collusive agreements from the industry's perspective. Horizontal mergers reduce the number of independent suppliers in the market place. When fewer suppliers are active in a market, the actions of the individual market actors are more visible and the probability that a non-conform increase in production levels ("cheating") is discovered is higher. The lower the monitoring costs (i.e. the greater the likelihood that "cheating" is discovered), the better the stability, profitability and therefore the attractiveness of cartel agreements.¹⁰ If agreements are

⁶ cf. Bacon (1997) and Burns et al. (1998).

⁷ cf. Kim und Singal (1993); Mulherin und Boone (2000), Tombak (2002).

⁸ cf. European Commission (2004).

⁹ cf. For example Eckbo (1983), p 272.

¹⁰ cf. Eckbo (1983); Stigler (1950).

not explicitly agreed, one speaks of “tacit collusion”. Likewise, for this form of agreement the easier it is to predict the influence of a few market players on product prices and profits, the stronger the attraction to lower production levels. Whether explicit or implicit, such collusion promises monopoly-like returns for all suppliers as a result of higher market prices across the board.¹¹

Therefore, an important prerequisite for the effectiveness of this mechanism is a regulatory framework allowing the suppliers to implement price increases or to prevent price cuts. This has been the case in the United States for most of the electricity market since 1992 and for individual European countries since the mid-1990s. By contrast, the gas market in most European countries is subject to stronger price regulation. In the USA, however, a large proportion of the gas market has been open to competition since 1984. In a production-cost-oriented price regulated market, the attraction of building up market power is much reduced: even under pricing agreements with competitors, the utilities are not in a position to increase their prices autonomously without first obtaining permission from the regulation authorities, who base their recommendations on the cost of provision.¹²

According to this argumentation, mergers between two competitors will have a positive effect on all other suppliers in the relevant market, as the probability of stable price agreements being reached rises. Whether the relevant market is regional, national or international is often the subject of intensive debate during cartel discussions.¹³ In the past, for most energy utilities, the relevant market has been assumed as regional or national.¹⁴

The deliberations above relate to horizontal mergers, as this kind of takeover reduces the number of competitors in the market and decreases the monitoring costs for collusive agreements. An additional means of increasing market power is through conglomerate takeovers. Advocates of the “mutual forbearance” theory¹⁵ identify two mechanisms in which, through implicit collusion among competitors across several different markets, an increase in market

¹¹ cf. Weston et al. (1997), p 83.

¹² cf. Fritsch et al. (2001), p 230.

¹³ cf. for example European Commission (1997).

¹⁴ In determining the relevant market a number of different competition approaches are discussed based upon the empirically determinable interrelationship between different suppliers. The “delivered price” test compares the prices which potential competitors are able to deliver at profit in a particular geographic market. All suppliers whose basic cost-covering price does not exceed the market price by more than for example 5% are considered to be competitors. As the data necessary to analyse such tests is not publicly available, these could not be considered. cf. Hieronymus et al. (2002), p 22.

Although the business activities of many European energy utilities increasingly address international markets, the Federal German Cartel Office (Bundeskartellamt) still views competition to be primarily within national markets as energy provision and transportation networks are still primarily internal and nationally-oriented (at least at the end of 2001). cf. Handelsblatt (2001), p 13.

¹⁵ cf. Edwards (1955).

power can be achieved.¹⁶ They argue that firms who compete with one another in more than one market (so-called “multimarket contact”) are more likely to consider each other as rivals and will therefore collect detailed information about the other. The more information they have, the better they are able to assess the interdependency of their own actions and the reactions of their rival. It is only through this “familiarity”¹⁷ with the behavior of the rival that a form of tacit collusion becomes possible, which benefits both parties.

In order for some kind of agreed behavior to actually come about, the respective competitors must be aware of the potential of the other to cause massive financial damage in response to possible own aggressive market behavior. If this kind of deterrent¹⁸ is not present a strong market actor will have no interest in taking a less aggressive stance towards weaker rivals.¹⁹ In general, “multimarket contact” implies that competitors have a variety of means of causing damage to their rivals. In such cases the deterrent can be particularly effective.²⁰ A conglomerate acquisition can improve the deterrent potential if it enables a firm to enter their rival’s most important market. If the competitor is also present in the first firm’s primary market, it can be of benefit to both to tacitly agree to refrain from intensive competition with one another.²¹ The “mutual forbearance” hypothesis has, for the most part, been confirmed in previous empirical studies, although contradictory evidence is also available.²²

In addition to “mutual forbearance”, firms with diverse interests in several markets are also able to strengthen their market power by cross-subsidization of individual branches with the profits of other more lucrative areas. This can help a firm to strengthen and improve its market position in the subsidized branch.²³

To summarize, conglomerate takeovers can also promote collusive behavior and lead to the strengthening of market power. This is, however, only possible under the aforementioned conditions. This limitation means that one would expect the motive “market power” to play a role in a smaller proportion of conglomerate transactions when compared with horizontal mergers. According to this line of reasoning, the stock price reactions for competitors to conglomerate transactions can therefore be expected to be lower on average.

The following hypotheses summarize the above discussion:

¹⁶ cf. Jayachandran et al. (1999), p 51.

¹⁷ cf. Baum und Korn (1999).

¹⁸ cf. Edwards (1955).

¹⁹ cf. Teece et al. (1997).

²⁰ The deterrent potential has an effect not only on existing direct competitors but also potential competitors. For the effect on potential competitors see Steiner (1975).

²¹ cf. Porter (1985).

²² cf. for an overview Jayachandran et al. (1999).

²³ cf. Trautwein (1990).

Hypothesis 1) Any kind of M&A transaction in the energy utilities industry can promote collusive behavior and thereby facilitates the exploiting of market power. Mergers between electricity or gas utilities therefore lead to an increase in the market value of industry competitors in the national market.

Whereas hypothesis holds for all kinds of mergers (horizontal, vertical, conglomerate), in hypothesis 2 we concentrate on horizontal national mergers and their impact on competitors.

Hypothesis 2) Horizontal mergers within national markets are a particularly effective means of increasing market power. Their announcements result in more pronounced stock price reactions for national competitors within the industry than other forms of M&A transactions will do.

A number of investigations do indeed contain indications that there is a positive relationship between the announcement of a merger and a change in the market value of competitors.²⁴ A proof of this relationship may be a *necessary* condition but not a *sufficient* condition for the market power hypothesis. Eckbo (1983) argues that a positive relationship can also be attributed to an information effect. For instance, this would be the case when the capital market assumes that as a result of the merger, the firms will be able to pursue more efficient production and/or investment strategies. As close competitors often have similar production methods, a merger can signalize that competitors may also be able to make use of this efficiency potential through further mergers in the future.

Song und Walkling (2000) pursue this argumentation further. They examine whether or not the level of stock price reaction is dependent upon the fact that further mergers are to be expected within the industry. The authors select the interval between the present and the point in time of the last merger within that industry as an indicator of further acquisition probability. They discovered that unexpected merger announcements, i.e. announcements which mark the end of a period of low takeover activity in a market, do trigger stronger stock price reactions by their competitors. Furthermore, the reactions are particularly marked by competitors who could themselves become a possible target of a future takeover. Their findings reinforce the so-called “acquisition probability” hypothesis, which posits that it is not the increase in market power that is responsible for the stock market price reactions of competitors but rather the message that a takeover announcement communicates about the possibility of future takeovers.

Hypothesis 3) The announcement of mergers between electricity or gas utilities is a signal for potential increased efficiency. This

²⁴ cf. Eckbo (1983); Eckbo (1985); Eckbo und Wier (1985); Jensen (1983); Mitchell und Mulherin (1996); Song und Walkling (2000); Stillman (1983).

leads to an increase in the market value of competitors. This is more pronounced at the beginning of a wave of takeovers or mergers than towards the end of such a phase.

Hypothesis 4) The announcement effect on the market value of competitors is particularly strong when they themselves are deemed potential targets of future takeovers.

Despite the high empirical relevance of takeovers by energy utilities in previous years, the authors are not aware of any scientific studies that explicitly examine the relationship between firm mergers and market power in the energy utilities industry.²⁵ This is most surprising, particularly when one considers the oligopolistic market structures in Europe and in Germany.²⁶

3. Sample and Methodology

In the following study the assumption is made that all electricity suppliers (or gas suppliers) compete with all other electricity suppliers (or gas suppliers) in the same national market. For the following analyses, the United States of America has been selected as the largest national market in North America, and Germany as the largest national market in Europe.²⁷

At a national level market power only plays a role for larger companies. Agreements between smaller suppliers have a limited effect on general market prices as their lower production levels only apply to a small segment of the market. As a relatively high number of energy utilities in the USA are publicly listed on the stock exchange (the Utilities S&P 1500 Index currently lists 86 firms), only the largest suppliers in the year of the respective announcement (as given in the Compustat database) are considered. Generated turnover serves as the selection criteria for the ten largest gas and the ten largest electricity suppliers of that year. In a subsequent step, the transactions made by acquiring firms who belong to the ten largest electricity or gas utilities were selected from the overall transaction sample.

In Germany the proportion of publicly listed companies is traditionally lower. From the beginning of the 1990s, only 32 electricity and gas utilities are listed, eight of which only for a limited period.²⁸ As these utilities all operate within the relatively confined area of Germany (in comparison to the extensive North American supply network) and most of them provide

²⁵ For an overview of examinations of takeovers by energy utilities see Schiereck und Thomas (2005).

²⁶ cf. Europäische Kommission (2004). A number of different investigations have analyzed whether or not the exploitation of market power leads to unfair competition, though independently of any concrete takeover projects. Joskow und Kahn (2001) and Joskow und Kahn (2002) have observed that disproportionately high electricity wholesale prices in California could be brought about by the concerted actions of three of the four principal electricity suppliers. Hildebrandt (2001) and Borenstein et al. (2000) come to similar conclusions for the same market. For the German wholesale electricity market Müsgens (2004) reports similar indications for an exploitation of market power.

²⁷ cf. Bundesministerium für Wirtschaft und Technologie (2003), p 39.

²⁸ cf. Ising und Schiereck (2003).

both electricity and gas, all the utilities in Germany have been considered potential competitors.

The takeovers and mergers among European and North American energy utilities between 1990 and 2002 were identified for this study using the following information sources:

- Thomson SDC International Mergers and Acquisitions Database,²⁹
- Zephus M&A-Database,
- M&A-Review Transaction database,
- Finance Deal database,
- Bloomberg,
- VDEW Database – Co-operations and takeovers among German electricity utilities.

Where details in the databases conflict with one another, information concerning individual transactions was additionally sourced from the Dun & Bradstreet, Creditreform and Mergerstat M&A business databases and verified in the financial press (particularly Handelsblatt, Frankfurter Allgemeine Zeitung and Financial Times) and the press departments of the respective companies. The securities exchange values and market capitalization of acquiring and target firms were obtained from the financial database Datastream. Calculation of daily returns is based upon a Total Return Index in which not only the stock price fluctuation but also dividend payments were taken into consideration.³⁰ The market indexes are defined similarly.

For further business data such as balance and profit and loss information, the Compustat (for US-American companies) and the Wordscope Disclosure databases were used as well as the Annual Reports of the respective companies.

The transactions selected for the study were chosen according to the following criteria:

- The acquiring firm is an electricity or gas supplier with headquarters in the USA or in Germany.
- The acquiring firm is publicly listed or has a majority stake in a publicly listed electricity or gas utility.³¹
- The takeover was not undertaken as part of a bidder consortium.

²⁹ Fuller et al. (2002), p 1770 examine using spot checks of 500 transactions the reliability of the Thomson SDC database. They discover that over 92% of the announcement dates quoted are exact. Of the remaining 8% none deviated by more than 2 days.

³⁰ It is assumed that dividend payments are used for the purchase of additional shares. cf. Datastream Definition Manual, p 66.

³¹ Information concerning shareholders of acquiring firms has been obtained from the Thomson Financial SDC database, the Dun & Bradstreet Firm database, the Creditreform balance database, Bloomberg, Wordscope Disclosure, Hoovers business database, press reports as well as information from the respective companies in their press material and internet pages.

- Stock price information is available for the period 20 days before and 20 days after the transaction. In the period 20 days before or 20 days after the transaction announcement, the acquiring firm only announced the very transaction.³²
- The transaction was announced between 1st January 1990 and 30th September 2002.
- The transaction was closed.
- The transaction value exceeded 1 million US\$.³³

During the given period a total of 70 cases are cited in the M&A database showing the following properties: the acquiring firm is located in the USA; it was one of the 10 largest electricity or gas utilities at the time of transaction announcement; and sufficient share price information is available for calculating capital market reactions. For Germany, 69 cases fulfill the equivalent criteria .

For the above takeovers, the stock price reactions for the acquiring and target firms as well as their competitors were determined using a methodology that takes into account the comparatively rapid progression of events after such an announcement. The average interval between two such events related to one firm sinks as a result of the higher overall number of events, as each announcement by an energy utility has implications for all their competitors.

Therefore, for this part of the analysis, a market model not requiring an estimation period was used and applied to only short event periods:

$$AR_{jt} = R_{jt} - R_{mt} \tag{1}$$

where

- AR_{jt} : Abnormal rate of return for security j of a competitor
- R_{jt} : Rate of return for security j on day t
- R_{mt} : Rate of return for the market index m on day t

Brown und Warner (1980) were able to demonstrate in a comparison that the differences between this model and a risk-adjusted market model are relatively small, especially for short event periods. Newer studies commonly use this approach, especially where events often overlap.³⁴

³² By excluding overlapping events, distortions as a result of erroneous ascribing of stock market reactions to a particular event can be avoided. cf. The exclusion of overlapping events for M&A Transactions, for example in Bartunek, Jessel and Madura (1993), Markides (1994), Travlos (1988), Walker (2000).

³³ cf. for example for the choice of minimal transaction volume of 1 million US\$ Fuller et al. (2002), p 1770.

³⁴ cf. for instance Fuller et al. (2002).

For the USA as a large national market, a national utility index containing the largest publicly listed utilities of the respective country was used as a market index. For Germany as a small national market, a general cross-industry index was used. The reason for this procedure lies in the small number of publicly listed utilities in Germany. For Germany, the Datastream Utility-Index contains share information for only 12 firms.³⁵ Possible stock price reactions of competitors would therefore directly affect the index rate of return and distort the calculation of abnormal rates of return.

As event period, the [-1;+1] interval was primarily considered, i.e. the period from one day before to one day after the event day. In addition the stock price reaction for the intervals [-5;+5] and [-2;+2] were also determined as well as for day {0} of the announcement. In this way, the effects of possible prior “information leakage” of takeover decisions could also be monitored.³⁶

The cumulative abnormal rate of return (CAR_j) for the different event periods $[t_1;t_2]$, the mean cumulative abnormal rate of return (CAR) and the average abnormal rate of return (AAR) on day t are calculated as follows:

$$CAR_{j,[t_1;t_2]} = \sum_{t=t_1}^{t_2} AR_{jt} \quad (2)$$

$$CAR_{[t_1;t_2]} = \sum_{t=t_1}^{t_2} \frac{1}{n} \sum_{j=1}^n AR_{jt} \quad (3)$$

$$AAR_{jt} = \left(\frac{1}{n} \right) \sum_{j=1}^n AR_{jt} \quad (4)$$

where

t_1, t_2 : the temporal limits of the consideration period with regard to the announcement date; $|t_1|, |t_2| \leq 5$ days.

n : Number of securities considered

To determine the net change in value for the shareholders of acquiring and target firms, the average abnormal rate of return and the mean cumulative abnormal rate of return for a hypothetical combined entity consisting of both acquiring and target firms was determined. This calculation allows one to draw conclusions about a possible prosperity transfer between the

³⁵ For the USA, the index is constructed from values for 58 utilities (date: December 2003).

³⁶ As a result investigations into transaction announcements typically take into account longer event periods. cf. Ghosh und Lee (2000), Seth (1990), Seth et al. (2002).

shareholder groups of the respective firms. As with the approach taken by Bradley et al. (1988), the abnormal rate of return is weighted with the respective market capitalizations:

$$AR_t^{CE} = \frac{AR_{tK} \cdot MK_K + AR_{tZ} \cdot MK_Z}{MK_K + MK_Z} \quad (5)$$

where

- AR_{tK} : Abnormal rate of return for the acquiring firm
- AR_{tZ} : Abnormal rate of return for the target firm
- $MK_{K \text{ or. } Z}$: market capitalization of acquiring or target firm on the day before the longest event period, here: -5 days.

The calculation of the cumulative abnormal rate of return and the average abnormal rate of return is undertaken in the same manner as the calculation of the respective sizes for acquiring or target firms.

In order to ascertain whether or not the average abnormal rate of return of the securities under consideration on day t significantly differs from 0, we apply t-tests. The test statistic for many-day event periods is calculated analog the approach taken by Brown und Warner (1985).

4. Empirical Results

The following section examines first the takeovers and mergers among US-American energy utilities. The examination is then repeated for takeovers and mergers among German energy utilities.

4.1 Takeovers of US-American Utilities

Table 1 lists the stock price reaction for the acquiring firm (column 2) and its competitors (column 3) at the time of announcement of takeovers in the US-American utilities market. For the acquiring firm the cumulative abnormal rate of return is negative for all event periods examined, although statistically these do not deviate significantly from zero. This observation suggests that from the perspective of the capital market, the transactions analyzed have on average hardly reduced the value of the acquiring firm.

However, for the acquiring firm's competitors in the market, the takeover announcement leads to a slight but significant decrease in their stock price value. For the interval $[-1;+1]$ the cumulative abnormal rate of return for the industry competitors was -0.21% (significant at a

1%-level). The mean value difference between the cumulative abnormal rate of return of acquiring firms and that of the competitors is not significant. These results do not correspond with Hypothesis 1, which posits that the market values of the industry competitors rise in response to a takeover announcement as a result of overall increased market power.

Table 1: Cumulative abnormal rate of return for the 10 largest US energy utilities at the time of (their own) takeover announcement compared with that of their industry competitors

	Stock market reaction for the acquiring firm	Stock market reaction for the industry competitors	Mean difference		
	CAR	CAR	CAR- difference	t-value	p-value
[-5;+5]	-0.16%	-0.34% **	0.18%	0.2854	0.7754
[-2;+2]	-0.83%	-0.16%	-0.66%	1.4008	0.1617
[-1;+1]	-0.53%	-0.21% **	-0.32%	0.8531	0.3939
{0}	-0.19%	-0.18% ***	-0.01%	0.0382	0.9695
n	70	589			

Table 2 compares the cumulative abnormal rate of return for the hypothetical combined entity with that of the acquiring firm's industry competitors at the time of takeover announcement. For only 25 of the overall 70 transactions the takeover target was a publicly listed firm allowing to calculate the cumulative abnormal returns for the hypothetical combined entity. The announcement effects for these combined entities are considerably higher than that of their competitors, and positive for all the event periods examined, though significant only on the day of the announcement and for the interval [-5+5]. This suggests that the combined entities of acquiring and target firms can strengthen their position through a merger at the cost of their competitors. However, it appears that only the shareholders of the takeover targets actually benefit from the improved market position.

The unequal distribution of benefits from a merger is consistent with the "winner's curse" hypothesis.³⁷ This hypothesis claims that the potential acquiring firm instinctively overestimates the advantages of a takeover, and is more likely to be able to win out against competing bids as they are more willing to pay a higher price / a higher takeover premium.

³⁷ cf. Varaiya (1988).

Table 2: Cumulative abnormal rates of return for the hypothetical combined entities at the time of (their own) takeover announcement compared with that of their competitors (USA)

	Stock market reaction for the acquiring firm (1)	Stock market reaction for the hypotheti- cal combined entity (2)	Stock market reaction for the industry com- petitors (3)	Mean difference (2) – (3)		
		CAR	CAR	CAR- difference	t-value	p-value
[-5;+5]	-1.03%	1.51% *	-0.56% *	2.06% **	2.2667	0.0243
[-2;+2]	-1.74%	1.06%	-0.56% **	1.61% *	1.9438	0.0531
[-1;+1]	-1.82%	1.11%	-0.46% **	1.57% **	2.3210	0.0212
{0}	-0.49%	1.28% **	-0.23% **	1.51% ***	4.0670	0.0001
n	25	25	207			

According to Hypothesis 2 pronounced positive stock price reactions are to be expected for industry competitors in the case of horizontal mergers between electricity or gas utilities. Table 3 compares the stock price reaction for energy utilities to the announcement of a horizontal merger with a national competitor with the competition's reaction to all other takeover announcements.³⁸ In contrast to expectations, the cumulative abnormal rate of return of the industry competition is negative throughout (significant at a 10%-level only for [-2;+2] and [10;10] intervals) and lower for almost all intervals than for all other kinds of transaction announcements (significant at a 5%-level for the [-2;+2] interval). One cannot rule out the possibility that this result has been distorted by a size effect. The average transaction volume of the first test sample is significantly lower than that of the remaining acquisitions. Hypothesis 2 therefore has to be rejected for takeovers among US-American energy utilities.

³⁸ Horizontal mergers were taken to be all transactions where the acquiring firm or target firm was either an electricity or gas supplier.

Table 3: Cumulative abnormal rates of return for the 10 largest US energy utilities at the time of the announcement of a horizontal merger by a competitor in the national market compared with the market reaction to all other takeovers by competitors

	Horizontal merger of a national target firm	All other takeovers	Mean difference		
	CAR	CAR	Difference	t-value	p-value
[-5;+5]	-0.60%	-0.31%	-0.29%	0.4434	0.6577
[-2;+2]	-1.24% *	-0.03%	-1.21% **	2.5415	0.0113
[-1;+1]	-0.64%	-0.15%	-0.49%	1.3123	0.1899
{0}	-0.26%	-0.17% ***	-0.08%	0.4149	0.6784
Mean transaction volume in million US\$	2,842	831	2,012 ***	6.6013	0.0000
n	65	524			

The next stage of analysis involved determining whether the stock price reactions observed can be explained by Song und Walkling (2000) and their “acquisition probability” hypothesis (Hypotheses 3 and 4) rather than by a desire to increase market power. The authors reason that the significant positive abnormal change in value as a reaction to takeover announcements by a competitor, as observed in their studies, can be explained by the increased probability that the competitors themselves may become the subject of a future takeover. Unlike in Song und Walkling (2000), the findings here do not exhibit a positive abnormal change in market value for the competitors. Nevertheless, it should be investigated whether the probability of a takeover may have another influence upon the announcement effects observed here. For instance, it is conceivable that a relationship exists between (the reduction in) regulatory intensity and takeover probability.

According to hypothesis 3, the announcement effects on competitors in the first phase of a wave of takeovers should be higher than in later phases. In order to examine this hypothesis, the takeover announcements were split into two time frames. The first group contains all takeover announcements between 1990 and 1996, the second group those transaction announcements between 1997 and 2002. The average cumulative abnormal rate of return of both groups is compared in Table 4. As expected, the market reaction in the first phase of a wave of takeovers is higher than in the second phase. The mean differences are, however, insignificant.³⁹

³⁹ In order to establish whether the CAR of the competitors exhibits a wave-like development, the mean announcement effects were additionally separated into three phases (takeover announcements between

Table 4: Cumulative abnormal rates of return for US energy utilities in response to a takeover announcement by a competitor for the first half and second half of a takeover wave

	Takeover announcements between 1990 and 1996	Takeover announcements between 1997 and 2002	Mean difference		
	CAR	CAR	difference	t-value	p-value
[-5;+5]	-0.11%	-0.41% **	0.30%	0.6101	0.5420
[-2;+2]	-0.14%	-0.17%	0.02%	0.0646	0.9485
[-1;+1]	0.04%	-0.28% **	0.31%	1.1119	0.2666
{0}	-0.12%	-0.20% ***	0.08%	0.5312	0.5955
Mean transaction volume in million US\$	606	1,185	-579 **	2.3795	0.0176
n	133	456			

The insignificant difference between the announcement effects in the individual phases does not support the suggestion that the decreasing intensity of regulation in the USA⁴⁰ has a systematic effect on the CAR of the industry competitors. These observations also do not indicate that there is necessarily a relationship between acquisition probability and regulation intensity.

The relevance of the “acquisition probability” hypothesis for describing the reaction of competitors’ market value is additionally assessed with a second test. To test this, the capital market reaction of the ten largest energy utilities to takeover announcements by competitors was examined based upon whether the respective competitor was indeed subject of a takeover at a later date or not. According to the “acquisition probability” hypothesis (Hypothesis 4), the capital market reaction for competitors who themselves became takeover targets later on should exceed that of the other competitors. Thus, only the takeovers announced until the end of the year 2000 were considered. This limitation was chosen so as to allow for a minimum period of at least 2 years in which each competitor could have become the target of a takeover. The average cumulative abnormal rate of return for both transaction groups is compared in Table 5.

1990 and 1993, 1994 and 1998, 1999 and 2002). For the most part, the CAR differences are insignificant to zero and do not exhibit any kind of clear pattern. The mean difference was not significant in any of the cases. This does not suggest a wave-like development and therefore the results have not been presented in detail.

⁴⁰ cf. Energy Information Administration (2001).

Table 5: Cumulative abnormal rates of return for US energy utilities who themselves become the target of a takeover later on, at the time of the announcement of a takeover by a industry competitor compared to that of other competitors.

	Competitors who later on themselves become target of a takeover	Competitors who are <i>not</i> targeted for takeover.	Mean difference		
	CAR	CAR	difference	t-value	p-value
[-5;+5]	-0.19% **	-0.19%	0.00%	0.0060	0.9952
[-2;+2]	-0.25%	-0.14%	-0.11%	0.2811	0.7788
[-1;+1]	-0.31% *	-0.10%	-0.20%	0.7178	0.4732
{0}	-0.44% **	-0.09%	-0.35% **	2.2436	0.0253
Mean transaction volume in million US\$	658	1,059	-401	1.4121	0.1585
n	96	422			

For both groups, the announcement effects are negative. A comparison of the market reaction of both groups does not show a clear picture. Only on day {0} of the announcement the differences can be regarded as significant. In fact, in contrast to hypothesis 4, the market reaction for competitors, who themselves later become takeover targets is significantly lower. One possible explanation for this may be that weaker businesses are more likely to be the target of takeovers at a later date.⁴¹ As these firms are among the less strong suppliers, market value depreciation as a result of intensified market competition is particularly damaging for them. It may be possible that the capital market reaction, as given in the negative abnormal rate of return on the date of announcement, anticipates this in advance.⁴²

In a nutshell, the results suggest that the announcement effects observed in the USA can indeed be explained by competition mechanisms. A signaling effect for the future target firm in response to the takeover announcement could not be confirmed. The market depreciation observed for the acquiring firm and its competitors following the announcement does not, in the view of the investors, signal an increase in market power, or an increased probability for stable cartels or collusive pricing behavior respectively. A possible increase in market value as a result of the takeover benefits only the shareholders of the takeover target. The market value of the acquiring firm and its competitors decreases. This observation may, however, also suggest that market competition as a result of the takeover has been intensified.

⁴¹ cf. for an investigation of the relationship between management performance and takeovers and of the “market for corporate control” Manne (1969); Jensen (1986).

⁴² A relationship between the CAR of branch competitors who later become the target of a takeover and the announcement effects on the acquiring firm, target and hypothetical joint organization of this later second takeover could not be determined. This supports the hypothesis that the capital market already takes into account the “acquisition probability” in its market value assessment of the competitor.

The findings from the above dichotomous investigations have been controlled for by using a multivariate regression analysis. As the dependent variable, the cumulative abnormal rate of return for the respective competitor firm for the interval [-1;+1] was chosen. The following independent variables were used for the various different regression models: “CAR acquiring firm” is defined as the cumulative abnormal rate of return for the acquiring firm; “CAR hypothetical combined entity” is the cumulative abnormal rate of return for the hypothetical combined entity; “National concentration strategy” is a dummy variable where the value “1” denotes that the transaction involves the takeover of a US electricity supplier (or gas supplier) by another US electricity supplier (or gas supplier); “National takeover” is a further dummy variable where “1” denotes that both acquiring firm and target firm come from the USA; “Competitor, later themselves target of takeover” is again a dummy variable where “1” denotes that the competitor under consideration at the time of the announcement later themselves became the target of a takeover. These variables are required in order to assess the “acquisition probability” hypothesis by Song und Walkling (2000). In order to test whether the stock price reaction for the competitors changes depending upon the time-frame and takeover activity intensity, the sample was additionally separated in two time frames: “Phase 1997-2002” is a dummy variable where the value “1” denotes that the respective transaction was announced in the second ‘phase’ of the sample duration. As final control variable, the “transaction volume” was also included.⁴³ The statistical relationship between the stock price reaction for competitors and the independent variables was analyzed using 6 models.⁴⁴

The results of the multivariate analysis are shown in Table 6. In model 1 the abnormal cumulative rate of return for the acquiring firm and that of the hypothetical combined entity are taken as influencing variables. The regression coefficient for the stock market reaction for the acquiring firm is positive (significant at a 1%-level). The coefficient for CAR of the hypothetical combined entity is by contrast not significant.

These results support the observations made in the dichotomous analysis: there is a statistical relationship between the abnormal market value development of the acquiring firm and that of

⁴³ The transaction volume serves as an indicator for the importance of the takeover from the perspective of acquiring firm and its branch competitors. This is used in place of a relative indicator (for instance turnover relationship of acquiring and target firms) for two reasons: firstly, it exhibits strong negative correlation (-0.7) with the turnover relation of acquiring and target firm, and secondly, the use of turnover relationship as descriptive variable would have reduced the sample from 589 to 173 as a result of insufficient available data. In addition, a separate analysis showed that the turnover relationship (as likewise the transaction volume shows) has no significant influence on the intensity of the announcement effects for the branch competitors.

⁴⁴ Table 14 in the appendix shows the descriptive characteristics of the independent variables. The correlation coefficients are used to indicate whether a multicollinearity problem can arise when all variables are considered.⁴⁴ The critical correlations and/or variable combinations are marked grey. These variable combinations are then omitted from the subsequent regression models.

its competitors. The larger the depreciation of the acquiring firm, the larger the corresponding market value depreciation of its competitors. This relationship is consistent with explanations that suggest a worsening of the market conditions, for instance through intensified competition and therefore reduced profitability as a result of higher supplier concentration.⁴⁵ According to this explanation, the respective takeover is seen as a signal for such future market development. The value of the regression coefficient is considerably lower than 1. This indicates that the market value of the acquiring firm on the date of the announcement is subject to a higher abnormal depreciation than that of its competitors.

In addition to general changes in market conditions affecting all competitors, the investors also expect to see specific value reduction for the acquiring firm as a result of the takeover. In other words, despite the decrease in competitors' market value at the date of announcement, the investors do not assume that the acquiring firm will attain an advantage over its competitors and a stronger position as a result of the takeover as with other passive strategies. As seen above, only the shareholders of the target firm actually profit from the overall positive market value increase of the hypothetical combined entity. That the relationship between the cumulative abnormal rate of return of the hypothetical combined entity and that of the competitors is not significant also indicates that the observed announcement effects for the competitors can be better explained by an intensification of market competition rather than by a direct worsening of their market position. In a regulated market, the effects of intensified competition are only indirect: where larger corporate units are able to lower their energy production costs through economy of scale effects, it is likely that at the next opportunity the regulation authorities will demand that consumer prices are lowered accordingly and they will not authorize price rises. The long-term result is a lower profit margin for all suppliers. If this cannot be compensated for by internal cost-cutting measures, then the overall profitability decreases. An analysis of household electricity prices in the USA between 1990 and 2002 does show a real price decrease of approximately 10%.⁴⁶

None of the remaining independent variables had a significant influence on the level of abnormal cumulative returns for the competitors.⁴⁷ The influence of the abnormal market value

⁴⁵ The profitability of publicly listed energy utilities in the USA between 1996 and 2000 has indeed worsened. The return on assets sank from almost 37% to 12%. cf. Energy Information Administration (2002). Additionally, the real household electricity prices have also decreased continually since 1985. cf. Energy Information Administration (2003c).

⁴⁶ cf. Energy Information Administration (2003c).

⁴⁷ The values for (adjusted) R^2 are relatively low, but lie within a typical range for financial multivariate analyses. cf. for example Hubbard und Palia (1999), p 1143; Leeth und Borg (2000), p 233; Fuller et al. (2002), p 1787 and especially the commentaries by Haleblan und Finkelstein (1999), footnote 9, p 47.

decrease of the acquiring firm also remains statistically significant when including the remaining variables (see Model 6 in Table 6).

Table 6: Multivariate Analysis of competitor reactions in the USA

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	0.0006	-0.0012	-0.0012	-0.0002	0.0016	-0.0002
t-value	0.2259	-0.9539	-0.8119	-0.1526	0.6466	-0.1595
CAR acquiring firm	0.2535***	0.1904***	0.1894***	0.2067***	0.1894***	0.2068***
t-value	4.5500	5.9135	6.0178	7.1865	6.0895	6.3576
CAR hypothetical combined entity	-0.0690					
t-value	-1.0932					
Concentration strategy		0.0008				0.0010
t-value		0.2096				0.2894
National takeover			0.0003			
t-value			0.1449			
Competitors, later target of takeover				-0.0018		-0.0019
t-value				-0.6661		-0.6828
Phase 1997-2002					-0.0034	
t-value					-1.2461	
Transaction volume						0.0000
t-value						-0.1797
R ²	0.1051	0.0591	0.0590	0.0921	0.0615	0.0922
Adj. R ²	0.0963	0.0559	0.0558	0.0885	0.0583	0.0852
F-value	3.9130	6.0900**	6.0860**	8.6344***	6.3555**	5.1515**
n	207	589	589	518	589	518

The results support the explanation that market competition is intensified as a result of the takeovers observed in the sample. They are not consistent with the hypothesis, that takeovers and mergers significantly strengthen the market power of the merger firms and that of their competitors.

This evidence has also to be evaluated in the context of the regional structure of this huge-scale nation. Only large companies who are able to finance high volume investments can aggressively contest markets on state level where providers are nowadays able to earn monopoly rents. Therefore, our results are also in line with findings of more recent studies which on the whole conclude that the US-American electricity utilities act strategically and exploit their market power.⁴⁸

The following chapter follows the same procedure as above for the analysis of takeovers among German energy utilities.

⁴⁸ cf. for example Joskow und Kahn (2001); Joskow und Kahn (2002); Borenstein et al. (2000); Hildebrandt (2001).

4.2 Takeovers of German Energy Utilities

Table 7 shows the cumulative abnormal rate of return for German energy utilities and their competitors at the time of a takeover announcement.

Table 7: Cumulative abnormal rate of return for German energy utilities at the date of announcement of (their own) takeover compared with the stock market reaction of their competitors.

	Stock market reaction for the acquiring firm	Stock market reaction for the competitors	Mean difference		
	CAR	CAR	differ- ence	t-value	p-value
[-5;+5]	-0.96%	0.54% ***	-1.50% **	2.1275	0.0335
[-2;+2]	-1.26% ***	0.26% ***	-1.53% ***	2.9028	0.0038
[-1;+1]	-0.27%	0.43% ***	-0.70% *	1.6893	0.0914
{0}	-0.14%	0.21% ***	-0.35%	1.3936	0.1636
n	69	1,405			

As observed for the US-American energy utilities, the market value of the acquiring firm in Germany decreases on average. The negative cumulative abnormal rate of return which can be observed for all event periods, is only significant for the event period [-2;+2]. However, for the competitors a different picture is shown: for all event periods analyzed the cumulative abnormal rate of return is positive (significant at a level of 1%).

Table 8 compares the cumulative abnormal rate of return of the hypothetical combined entity with that of the acquiring firm's competitors.⁴⁹ The abnormal changes in market value for the combined entity are positive, though not significantly above zero. The stock price reactions for the competitors are also positive (significant at a level of 5% for day {0} and the event period [+5;-5]). The difference between the CAR of the combined entity and that of the competitors is not significant. This observation suggests that the advantages of the merger are only seen by the shareholders of the target firm. The hypothetical combined entity could not improve its market position with regard to its competitors.

⁴⁹ The target firm was publicly listed in only 34 cases, which leads to a smaller sample.

Table 8: Cumulative abnormal rate of return for the hypothetical combined entity at the time of (their own) takeover announcement compared to the market reaction for the industry competitors in Germany.

	Stock market reaction for the acquiring firm (1)	Stock market reaction for the hypothetical combined entity (2)	Stock market reaction for the industry com- petitors (3)	Mean difference (2) – (3)		
		CAR	CAR	CAR- difference	t-value	p-value
[-5;+5]	-0.96%	0.68%	0.39% **	0.29%	0.2924	0.7700
[-2;+2]	-1.26%***	-0.05%	0.11%	-0.15%	0.1912	0.8484
[-1;+1]	-0.27%	0.97%	0.19%	0.77%	1.3405	0.1805
{0}	-0.14%	0.42%	0.13% **	0.30%	0.9426	0.3462
n	34	34	693			

To summarize, the findings are consistent with Hypothesis 1, in which increased market power is seen as an important motive for takeovers and mergers. This can be seen in the increased market value of the hypothetical combined entity (acquiring and target firms) as well as that of the competitors. The shareholders of the acquiring firm suffer losses but these are more than compensated for by a gain in market value for the target firm. This suggests a value transfer from the acquiring firm to the target firm.

Alternatively, it would also be conceivable that the increased market concentration as a result of the takeover has no direct influence on the market value of the competitors, put another way, the market power considerations do not play a role. Instead the increase in the market value of the competitors could be a direct reaction to the high takeover costs incurred by the acquiring firm. According to this explanation, the acquiring firm is weakened by the takeover allowing its competitors space for potential growth. For this possible explanation one would expect a negative correlation between the announcement effects for the acquiring firm and its industry competitors. The more acquiring firms are weakened by takeovers, the more the competitors stand to benefit from their weakness. The increase in market value for the target firm could be neglected for the purposes of analysis as it does not stand in direct competition with the acquiring firm's competitors. Which of these possible explanations better fits the announcement effects observed will be examined in more detail using a multivariate analysis at the end of this chapter.

According to Hypothesis 2 market power is achieved more effectively through horizontal mergers within the same national market. In this case, higher abnormal rates of return are to

be expected for the competitors. Table 9 compares the abnormal market value development for the competitors upon the announcement of a national horizontal merger compared with that when other kinds of takeovers are announced. The results confirm that for all event periods, the abnormal rate of return for the competitors in the case of national horizontal mergers is higher than for the comparison group. The difference in CAR between the two is, however, only statistically significant for the [-5;+5] interval. The results of Table 9 could therefore be seen as a weak confirmation of Hypothesis 2.

Table 9: Cumulative abnormal rate of return for German energy utilities at the time of the announcement of a national horizontal merger compared to the market reaction to all other kinds of takeovers by competitors.

	Horizontal merger of a national target firm	All other takeovers	Mean difference		
	CAR	CAR	difference	t-value	p-value
[-5;+5]	1.20% ***	0.17%	1.03% ***	3.0373	0.0024
[-2;+2]	0.27%	0.11%	0.16%	0.6132	0.5398
[-1;+1]	0.56% ***	0.26% ***	0.30%	1.4756	0.1403
{0}	0.32% **	0.14% ***	0.17%	1.4331	0.1520
Mean transaction value in million US\$	759	1,511 ***	-752 ***	6.7191	0.0000
n	368	1,037			

Hypotheses 3 and 4 are based upon the “acquisition probability” theory by Song und Walkling (2000). The theory explains the increase in market value of the industry competitors as a result of a takeover announcement by arguing that the investors see the probability rise that the competitors themselves may subsequently become the target of a takeover.

According to Hypothesis 3, the announcement effects for the competitors in the first phase of a takeover wave will be higher than in the later phase. Table 10 compares the CAR for the industry competitors for the period 1990-1996 and 1997-2002. The results do not confirm Hypothesis 3. The differences between the mean announcement effects of both phases are inconsistent and insignificant. This unsatisfactory result causes us to change the setup slightly. Table 11 compares the mean CAR for the industry competitors for three time frames in the sample time period. The highest announcement effects were observed between 1994 and 1998 (second phase). The CAR for this phase is significantly higher than for both the earlier and later time frames. Unlike the results for the USA, a waveform pattern of development for the market reactions to takeover announcements can indeed be put forward. These findings sup-

port, at least in part, the “acquisition probability” hypothesis. The higher mean CAR for the competitor in the second phase could be interpreted as an advance anticipation of the large number of takeovers to follow in the years after.

Table 10: Cumulative abnormal rate of return for German utilities at the time of a takeover announcement of a competitor for the first and second phases of a wave of takeovers.

	Takeover announcements between 1990 and 1996	Takeover announcements between 1997 and 2002	Mean difference		
	CAR	CAR	CAR- differ- ence	t-value	p-value
[-5;+5]	0.36% *	0.59% ***	-0.24%	0.6502	0.5157
[-2;+2]	0.27% *	0.26% **	0.01%	0.0323	0.9742
[-1;+1]	0.41% ***	0.43% ***	-0.02%	0.0868	0.9309
{0}	0.10% *	0.24% ***	-0.14%	1.0959	0.2733
Mean transaction volume in million US\$	450	1,073	-623 ***	4.8026	0.0000
Number	318	1,087			

Table 11: Cumulative abnormal rate of return for energy utilities at the time of a takeover announcement by a competitor during the first, second and third phase of the takeover wave

	Phase 1 Takeover announcements 1990-1993	Phase 2 Takeover announcements 1994-1998	Phase 3 Takeover announcements 1999-2002	Mean difference		
				Phase 1 - Phase 2	Phase 1 - Phase 3	Phase 2 - Phase 3
[-5;+5]	0.54% *	0.27%	0.63% ***	0.27%	-0.09%	-0.36%
[-2;+2]	0.09%	0.67% ***	0.16%	-0.57% *	-0.07%	0.51% *
[-1;+1]	0.24%	0.87% ***	0.31% ***	-0.63% *	-0.08%	0.56% **
{0}	0.26% ***	0.23% *	0.20% ***	0.04%	0.06%	0.03%
Mean transac- tion vol- ume in million US\$	666	984	1.117	-318 *	-451 **	-133
n	148	307	950			

The waveform progression also suggests that the intensity of regulation has no systematic influence on the “acquisition probability”. The intensity of the energy market regulation has decreased consistently since 1990.⁵⁰ If the intensity of regulation were to influence the acqui-

⁵⁰ cf. European Commission (2004); Schuppe und Nolden (1999).

sition probability, then one would also expect to see a consistent pattern for the CAR for the industry competitors.

One further investigation also tests the “acquisition probability” hypothesis. Table 12 compares the abnormal market value changes for those industry competitors who subsequently themselves become the target of a takeover with the rest of the industry competitors.⁵¹

Table 12: Cumulative abnormal rate of return for German energy utilities that later themselves become target of a takeover, at the time of the announcement of a takeover by a industry competitor compared to the market reaction for other competitors.

	Competitors who later become target of a takeover	Competitors who are not targeted for a takeover	Mean difference		
	CAR	CAR	CAR- difference	t-value	p-value
[-5;+5]	0.65% **	0.36% *	0.29%	0.7533	0.4514
[-2;+2]	0.32%	0.30% **	0.02%	0.0557	0.9556
[-1;+1]	0.40% **	0.31% **	0.09%	0.3637	0.7162
{0}	0.04%	0.12%	-0.08%	0.5684	0.5699
Mean transaction volume in mil- lion US\$	892	1,030	-138	0.8734	0.3826
N	292	635			

Hypothesis 4 claims that the announcement effects for the first group of competitors (later target of a takeover) should be higher. For three of the event periods observed, the cumulative abnormal rate of return is indeed higher for those industry competitors who later became targets of takeovers. However, the mean differences for all intervals are not significant and can at best only be regarded as a weak confirmation of Hypothesis 4. Taking into account the previously discussed results for Hypothesis 3, the usefulness of the “acquisition probability” explanation can generally be described as very limited. The results of the dichotomous analyses for the German market are however consistent with Hypotheses 1 and 2, which support the increase of market power as a motive for takeovers.

The results from the univariate analysis can be confirmed using a multivariate regression analysis. As with the analyses for the US-market, the cumulative abnormal rate of return for the competitors for the event period [-1;+1] interval was selected as the dependent variable.

⁵¹ Again, as with the analyses for the US-market described in the previous chapter, only those takeovers which had been announced by the end of the year 2000 were taken into account. This limitation ensures that for each competitor a two year period of observation is ensured in which further takeovers can be observed or excluded.

The dummy variables “CAR acquiring firm”, “CAR hypothetical combined entity”, “Concentration strategy”, “National takeover”, “Competitor, later target of takeover”, and “Phase 1997-2002” were likewise defined as in the US-analysis.⁵²

The results of the multivariate analysis are given in Table 13. Model 1 takes into account the cumulative abnormal rate of return for the acquiring firm as the single independent variable. The corresponding regression coefficient is positive and highly significant different from zero (at a 1% level). The higher the abnormal gain (or loss) in market value, the higher is the simultaneous gain (or loss) in market value for the industry competitors. These observations support the hypothesis that an increase in market power is responsible for the positive market value reaction for the competitors. By comparison, they are not consistent with the explanation that the announcement effects for the competitors are due to a weakening of the acquiring firm. This would only be the case if the market value of the industry competitors were to increase further as the market value of the acquiring firm weakens.

Model 2 analyzes the relationship between the cumulative abnormal rate of return for the hypothetical combined entity and the capital market reaction for the competitors. Again, a positive relationship can be observed (significant at a level of 1%). This was to be expected as the CAR for the acquiring firm already correlated well with that of the hypothetical combined entity.

In model 3, we include an additional dummy variable which carries the value “1” when the CAR for the competitor is a reaction to a national horizontal merger. Consistent with the findings from the dichotomous analysis, the regression coefficient is indeed positive but not significant.

Model 4 checks whether national takeovers cause stronger market value gains for the competitors than international takeovers. The regression coefficient for the respective dummy variable is positive and significant (at a 1% level). Again, the results of the dichotomous analysis are confirmed: for national takeovers a higher abnormal gain in market value can be observed.

⁵² Table 15 in the appendix shows the descriptive characteristics of the independent variables. The correlation matrix shows that the correlation coefficient for only two of the variable pairs exceeded 0.5. Even though in one case the value lies only just below the critical limit, the following investigations do not attempt to test the explanation theories for the respective variables simultaneously.

Table 13: Multivariate analysis of the market reaction for competitors (Germany)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	0.0046	0.0013	0.0042	-0.0019	0.0047	0.0048	-0.0057 **
t-value	5.0169	1.0353	3.9853	-1.4577	3.2633	4.5811	-2.2820
CAR acquiring firm	0.0726 ***		0.0704 ***	0.0405 ***	0.1387 ***	0.0740 ***	0.0593
t-value	2.5851		2.4881	1.4477	3.7620	2.6163	1.3809
CAR hypothetical combined entity		0.0907 ***					
t-value		2.9188					
Concentration strategy			0.0013				
t-value			0.6403				
National takeover				0.0125 ***			0.0149 ***
t-value				6.9233			6.2902
Competitor, later target of takeover					0.0005		0.0008
t-value					0.2151		0.3160
Phase 1997-2002						-0.0009	0.0021
t-value						-0.4216	0.7865
Size							0.0000
t-value							1.2089
R ²	0.0048	0.0122	0.0051	0.0382	0.0155	0.0049	0.0382
Adj. R ²	0.0041	0.0107	0.0037	0.0368	0.0134	0.0035	0.0347
F-value	1,6912	2,1207	1,1953	9,2460 ***	2.4186	1.1560	3.0262 *
n	1,405	693	1,405	1,405	927	1,405	927

Model 5 introduces a dummy variable that indicates whether the respective industry competitor later themselves became the target of a takeover. With a value of 0.0004 the estimated regression coefficient is positive but does not differ significantly from zero. This does not indicate a stable relationship between the two.

Model 6 examines whether the market value gain or loss for energy utilities as a reaction to the takeover announcement differs for competitors in the earlier or later phase of the wave of takeovers. The dummy variable “Phase 1997-2002” carries the value 1 when the takeover takes place in the second half of the sample period. The respective regression coefficient is negative but differs insignificantly from zero. The results of model 4 and 5 support the previous findings from the dichotomous analysis: the usefulness of the “acquisition probability” explanation is very limited.

Model 7 considers various influencing variables simultaneously. In contrast to all other models, the regression coefficient for the cumulative abnormal rate of return for the acquiring firm

is not significant in this model. A highly significant influence is, however, determined for the variable “national takeover”.⁵³

To summarize, the multivariate regression analysis largely confirms the previous findings from the dichotomous analysis for German energy utilities. Clear indications of negative competition effects can be observed which can be attributed to a gain in market power for those industry competitors not involved in the respective takeover. When considering the high concentration of suppliers in Germany this result is not surprising. In 2004 the three largest electricity producers accounted for 61% of the market. Likewise, the concentration of suppliers for the gas market is high.⁵⁴

5. Conclusions

From the perspective of the capital market, mergers and takeovers within the US-American utilities market since 1990 have not lead to an increase in market power. Although the market value of the hypothetical combined entity comprising acquiring and target firms did on average rise on the day of the takeover/merger announcement, the market value of their national industry competitors sank as did that of the acquiring firm. The larger the market value loss incurred by the acquiring firm, the more pronounced the market value decrease of its competitors. This indicates that the capital market expects a worsening of market conditions as a result of the takeover, for instance as a result of intensified competition and an accompanying reduction in profit-margins. For markets subject to external regulation, the increased competition has only an indirect effect on the rates as regulated by the authorities. If the acquiring firm is able to reduce their specific cost of production through economies of scale following a merger or takeover, this will generally result in a long-term reduction of authorized energy rates. The end customer electricity rates in the USA have in fact fallen over the period of the study sample.

In Germany by contrast, the study clearly indicates that the potential to increase market power is indeed an important motive for takeovers within the German energy utilities market: The market value of a publicly listed energy supplier rose significantly in response to a takeover announcement from a competitor. In the case of national horizontal mergers, this effect was particularly pronounced. The effect of the announcement on the market value of industry competitors is not explained by the possibility that these may in turn themselves become the

⁵³ A further model was estimated which uses the same descriptive variable as model 6 with the exception of the CAR of the acquiring firm. Instead the CAR for the hypothetical joint organization was used in its place. The results corroborate with those for model 6. Most notably, the regression coefficient for the CAR for the hypothetical joint organization is not significant.

⁵⁴ cf. European Commission, p 4 and p 11.

target of a takeover and that the capital market already anticipates this. Based upon the takeovers among German utilities analyzed in this study, the “acquisition probability” hypothesis has to be qualified. The findings are more consistent with the explanation that takeovers lead to an increase in the market power of the remaining market actors.

The clear difference between the findings for the US-American and German markets can be explained in several ways: to begin with, the regulation mechanisms are different in both markets. Where in Germany the wholesale sector of the electricity market has been deregulated since 1997, this is not the case for all federal states in the USA.⁵⁵ Market power is only an advantage when it can be used to bring about a rise in sales prices. This is not always possible when operating within regulated markets. It would be useful in future studies to analyze the relationship between the kind of regulation and its intensity on the one hand and growth of market power as a result of takeovers on the other.

Furthermore, the structure of the US-American market differs from that of the German market. Whereas in the USA the largest three energy suppliers cover approximately 8% of the entire capacity⁵⁶, in Germany the top three cover 61% of the market.⁵⁷ In oligopolistic market structures such as that of Germany, the potential to expand one’s market power is much higher than in polypolistic markets. One should also, however, consider that the US-American market is not homogenous but rather a series of regional markets. The transport network in the USA consists of three sub-networks, the so-called Eastern Interconnect, the Western Interconnect and the Texas Interconnect. The ability to transfer between these networks is very limited. The different sub-networks therefore operate largely independently of one another.⁵⁸

When one considers the differences between the US-American and German-European markets, the divergent findings for the relationship between business mergers and market power in the US and European energy markets appears less surprising.

For economic policy, the findings offer important indicators as to whether the mergers analyzed, particularly those within the German energy utility markets, should be regarded as positive from an economic point of view. The exploitation of market power can lead to inefficiency at exaggerated prices. At the same time mergers can also result in improved efficiency as a result of economies of scale and scope. To fully assess this question, the potential improved efficiency must be offset against possible inefficiency as a result of exploitation of

⁵⁵ cf. Energy Information Administration (2003b).

⁵⁶ cf. Energy Information Administration (2005).

⁵⁷ cf. European Commission (2004), p 4.

⁵⁸ cf. Energy Information Administration (2001), p 14.

market power. An analysis of the effects of mergers on the efficiency of the energy suppliers would be a worthwhile addition to the results of this study.

In the medium to long term, it is to be expected that the German market for energy supply will expand to become a European market. At least, this is the declared aim of the European domestic market policy guidelines for electricity and gas. A larger market with a greater number of market actors will reduce the basic means of establishing large-scale market power. In the case of large firm mergers in the European energy market, the cartel office will nevertheless have to carefully examine the relationship between utility mergers and the exploitation of the resulting increase in market power.

Appendix

Table 14: Descriptive analysis of the independent variables for the competition analysis (USA)

		Arithmetic mean	Standard deviation	n	Correlations						
					1	2	3	4	5	6	7
1	CAR acquiring firm	-0.01	0.04	589	1.00	0.47	-0.13	-0.15	-0.01	0.02	-0.37
2	CAR hypothetical combined entity	0.01	0.04	207	0.47	1.00	-0.08	-0.26	-0.08	-0.17	-0.12
3	National concentration strategy	1.06	12.83	590	-0.13	-0.08	1.00	1.00	-0.18	1.00	0.12
4	National takeover	0.84	10.16	590	-0.15	-0.26	1.00	1.00	0.15	1.00	0.01
5	Competitors, later target of takeover	0.19	0.39	518	-0.01	-0.08	-0.18	0.15	1.00	-0.04	-0.05
6	Phase 1997-2002	1.55	18.75	590	0.02	-0.17	1.00	1.00	-0.04	1.00	0.09
7	Transaction volumes	1014,21	2348,57	589	-0.37	-0.12	0.12	0.01	-0.05	0.09	1.00

Table 15: Descriptive analysis of the independent variables for market competition analysis (Germany)

		Arithmetic mean	Standard deviation	n	Correlations						
					1	2	3	4	5	6	7
1	CAR acquiring firm	0.00	0.03	1405	1.00	0.83	0.12	0.17	0.03	-0.12	0.31
2	CAR hypothetical combined entity	0.01	0.04	693	0.83	1.00	0.12	0.18	0.05	-0.12	0.14
3	National concentration strategy	0.26	0.44	1405	0.12	0.12	1.00	0.58	-0.03	0.04	0.18
4	National takeover	0.51	0.50	1405	0.17	0.18	0.58	1.00	-0.02	0.06	0.05
5	Competitor, later target of a takeover	0.31	0.46	927	0.03	0.05	-0.03	-0.02	1.00	-0.14	-0.03
6	Phase 1997-2002	0.77	0.42	1405	-0.12	-0.12	0.04	0.06	-0.14	1.00	0.12
7	Transaction volume	940.96	2153.14	1405	0.31	0.14	0.18	0.05	-0.03	0.12	1.00

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